STEP 1: Calculate the area and the centroid for an individual sign or a sign cluster. Note that the centroid and areas have been calculated for frequently used sign clusters. These are shown on Sheet 3, 4, and 5.

### ALUMINUM COLUMN (POST) SELECTION TABLE

<table>
<thead>
<tr>
<th>Size</th>
<th>Local Area</th>
<th>Global Area</th>
<th>Global Moment of Inertia</th>
<th>Area</th>
<th>Diameter</th>
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<tr>
<td></td>
<td>(in. x in.)</td>
<td>(in. x in.)</td>
<td>(in. x in.)^2</td>
<td>(in.)^2</td>
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<td>145.80</td>
<td>243.00</td>
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</tbody>
</table>

For 'H' = 11 ft, Area = 16 ft^2.

- Refer to the Aluminum Column (Post) Selection Table from Sheet 3 and shown here for reference.
- To determine the required post size, find the intersection of the row labeled '11 SF' and the column labeled '16 FT.' For example, the intersection value is '4' (4" OD).
- In the Column (Post) and Foundation Table, the value 'H' shows the design requires a 4" diameter and 3.5' deep Concrete Foundation and 3.5' Stud.

STEP 2: Determine the height 'H' from groundline to the centroid of the individual sign or sign cluster.

Assume: 'B' = 1 ft, 'C' = 1 ft.

Calculated: \( H_B = -0.1 \text{ ft}, H_C = 2.26 \text{ ft}. \)

### GENERAL NOTES:

1. Shop Drawings:
   - This Index is considered fully detailed. Submit Shop Drawings only for minor modifications not detailed in the Plans.

2. Aluminum Sign, Wind Beams, and Column (Post) Materials:
   - A. Aluminum Plates: ASTM B209, Alloy 6061-T6
   - B. Aluminum Bars and Extruded Shapes: ASTM B231, Alloy 6061-T6
   - C. Aluminum Structural Shapes: ASTM B808 Alloy 6061-T6
   - D. Cold Aluminum: ASTM B209 Alloy 5356-T6
   - E. Aluminum Weld Material: ER 5556 or 5356

3. Sign Mounting Bolts, Nuts and Washers:
   - A. Aluminum Button Head and Flat Head Bolts: ASTM F468, Alloy 2024-T4
   - B. Aluminum Hex Nuts: ASTM F467, Alloy 6061-T6 or 6262-T19
   - C. Aluminum Washers: ASTM B221, Alloy 7075-T6

4. Stainless Steel Bolts, Nuts and Washers may be used in lieu of the Aluminum button head and flat head bolts as follows:
   - A. Stainless Steel Bolts: ASTM F 593 Alloy Grade 2, Condition A, CWI or SHI
   - B. Stainless Steel Nuts: ASTM F 594

5. Sign Column (Post) Bolts, Nuts and Washers:
   - A. Galvanized U-Bolt (Column) ASTM A499 or ASTM A193 B7 according to ASTM D1229 with double nuts
   - B. Aluminum Bolts (Sleeves): ASTM F468, Alloy 6061-T6 or 2024-T4 with Hex Nuts ASTM F467, Alloy 6061-T6 or 6262-T19 and Washers B221, A325 2024-T4
   - C. Galvanized High Strength Hex Head Bolts (Bolts): ASTM F 593, Grade 5125, Type 1
   - D. Galvanized Hex Nuts: ASTM A 563 Grade OH
   - E. Galvanized Washers: ASTM A 563
   - F. Galvanized Bolts (Sleeve): ASTM A307 with Galvanized Hex Nuts and Washers

6. Coatings:
   - A. Aluminum Fasteners: Anodic coating (0.0002 inches min.) and chromate sealed
   - B. Stainless Steel Hex Nuts and Washers: ASTM F 594
   - C. All other steel items (excluding stainless steel): Hot dip Galvanize - ASTM A123
   - D. Repair damaged galvanizing in accordance with Specification 362

7. Breakaway Support REQUIREMENTS:
   - Install non-frangible aluminum column (post) (larger than 3") with breakaway supports as shown on Sheet 4. Signs shielded by barrier wall or guardrail do not require breakaway support.

---

**GUIDE TO USE THIS INDEX**

**SINGLE COLUMN GROUND SIGNS**

**GENERAL NOTES AND DESIGN EXAMPLE**

**INDEX**

**SHEET**

**DESCRIPTION:**

**FY 2019-20 STANDARD PLANS**

**LAST REVISION:**

**REV 01/18**
\[ \bar{x}_C = \frac{\sum (x_i \cdot A_i)}{\sum A_i} \]
\[ \bar{y}_C = \frac{\sum (y_i \cdot A_i)}{\sum A_i} \]

- $A_i$ = Area of individual sign
- $\bar{x}_C$ = Centroid horizontal location of sign or cluster from Aluminum Column (Post)
- $\bar{y}_C$ = Centroid vertical location of sign or cluster from mounting elevation
- $\bar{x}_n$ = Individual sign centroid horizontal location from Aluminum Column (Post)
- $\bar{y}_n$ = Individual sign centroid vertical location from mounting elevation
- $\bar{x}_g$ = Centroid horizontal location of sign or cluster from bottom of sign cluster
- $\bar{y}_g$ = Centroid vertical location of sign or cluster from bottom of sign cluster

NOTES:
1. For ‘B’ & ‘C’ see Index 700-101 and Roadway Plans.
2. Do not exceed an area of 30 SF or a width of 60 inches for a sign or a sign cluster, including rotated sign panels.
3. Vertical sign spacing (1" shown on Sign Cluster detail) also applies to rotated signs.

CALCULATION OF SIGN CLUSTER CENTROID

DETAILED EXAMPLE - CENTROID

SIGN CLUSTER

\[ \bar{x}_C = \frac{\sum (x_i \cdot A_i)}{\sum A_i} \]
\[ \bar{y}_C = \frac{\sum (y_i \cdot A_i)}{\sum A_i} \]

COUNTY

Aluminum Column (Post)
### ALUMINUM COLUMN (POST) SELECTION TABLE (O.D. in.)

<table>
<thead>
<tr>
<th>Inside Diameter (in)</th>
<th>Column (Post) Size</th>
<th>8 ft</th>
<th>9 ft</th>
<th>10 ft</th>
<th>11 ft</th>
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<th>15 ft</th>
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</tbody>
</table>

### Foundation Table

<table>
<thead>
<tr>
<th>Column (Post) Size</th>
<th>Driven Post Size</th>
<th>Foundation Alternatives</th>
<th>Column (Class I)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O.D. (in.)</td>
<td>Embedment Depth (ft)</td>
<td></td>
</tr>
<tr>
<td>3 ft</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
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<tr>
<td>4 ft</td>
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<td>5 ft</td>
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<td>6 ft</td>
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<td>7 ft</td>
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### Installing Frangible Column Supports:
- Columns (posts) 3" O.D. and less are considered frangible and may be installed either by driving the post or setting the posts in preformed holes. Backfill preformed holes with suitable material tamped in layers not thicker than 6" (to provide adequate compaction) or filled with flowable fill or bagged concrete.

### Offset Sign

**NOTE:**
1. For offset sign placement see Index 700-101.
2. For signs with widths greater than 4' see Index 700-011.
3. Offset signs with driven posts require a soil plate.
BOLTED STUB/SLEEVE BASE

DESCRIPTION:

- SHIM SHEET
- 11/01/18
- REVISION
- LAST

SLIP BASE AND FOUNDATION DETAIL (Non-Frangible Column, Typ.)

'L' 'H' 'T' 'W' 

stub length

footing depth

28 ga. Thick aluminum strip
2 reqd. per base

BOLT KEEPER PLATE DETAIL

Shims as reqd. (See Note 3.2)

Aluminum Column Sleeve
(See STUB/SLEEVE & BASE PLATE DETAILS)

WELDED STUB BASE

Aluminum stub sleeve

STUB/SLEEVE & BASE PLATE DETAILS

Base Plate

stub size equals min. sleeve size or larger

Aluminum Column Sleeve
(See STUB/SLEEVE & BASE PLATE DETAILS)

BOLTED STUB/SLEEVE BASE

SLIP BASE AND FOUNDATION DETAIL

(Non-Frangible Column, Typ.)

SLIP BASE AND FOUNDATION DETAIL IN CONCRETE

(Non-Frangible Column In Crossovers, Medians & Sidewalks)

NOTES:

1. Foundation Notes for Slip Base:
   a. Place stub in concrete foundation given in the FOUNDATION TABLE using Class I concrete.

2. Slip Base Fabrication Notes:
   a. The difference between the O.D. of the post and I.D. of the sleeve must be 3/8" or less.

3. Base Bolt Assembly Instructions:
   a. Assemble the Slip Base as follows:
      1. Insert post into sleeve and connect using 2 - 1/2" diameter sleeve bolts. (See Detail 'A')
      2. Assemble top base plate to bottom Base Plate using Base Bolts (high strength) with 3 washers per bolt. (See Detail 'A')
      a. Place one washer on each base bolt between the bottom base plate and the base bolt head.
      b. Place the next washer between the bottom base plate and the bolt keeper plate.
      c. Use brass or galvanized steel shims to plumb the post.
      d. Add the top base plate section.
      e. Place the third washer between the top base plate and the nut.
   b. Orient the bolt keeper plates in the direction of traffic.
   c. Tighten bolt bolts as follows:
      1. Tighten Base Bolts to the maximum possible with a 12" to 15" wrench (this will bed the washers and shims and clear the bolt threads).
      2. Loosen each base bolt one turn.
      3. Under supervision of the Engineer, use a calibrated wrench to tighten bolts to the torque prescribed in the SLIP BASE DETAILS Table. Note: over tightened base bolts are not permitted.
      4. Distort bolt threads at the junction with nuts to prevent loosening. Repair damaged galvanizing.
      d. Obtain a tight sleeve connection by placing 4 galvanized steel shims between the column (post) and sleeve. Space the shims evenly around the perimeter of the column (1 between each bolt hole, 4 total). Use shims that are 1" shorter than the height of the sleeve.

SLIP BASE DETAILS

<table>
<thead>
<tr>
<th>Column (Post) Size</th>
<th>Sleeve Thickness</th>
<th>Sleeve Height</th>
<th>Post Height</th>
<th>Base Plate Dia</th>
<th>Base Plate Torque</th>
<th>Hole Size 'D'</th>
<th>SWH</th>
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<td>375</td>
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</tbody>
</table>

INDEX

700-010 4 of 9
**ALUMINUM SOIL PLATE DETAIL**

- **Optional Slotted Holes**

- **DETAIL "B"**

- **Thickness = 9/16"**

- **1/3 Of Embedment Depth**

- **2" Thick Grout Seal**

**PLAN**

- **3 5/8" O.D. Max. Aluminum Column (Post)**
- **U Bolt**
- **Hole**
- **2" Thick Grout Seal**

**ELEVATION**

- **8" Min., 1'-6" Max. Aluminum Soil Plate**
- **2" Grout Seal**

**DRIVEN POST DETAIL**

(Frangible Post In Crossovers, Medians & Sidewalks)

**DRIVEN POST AND SOIL PLATE DETAIL**

- **10/30/18 PM R E V I S I O N**

**REVISION**

- **DESCRIPTION:**

**FY 2019-20 STANDARD PLANS**

**SINGLE COLUMN GROUND SIGNS**

**INDEX**

**700-010**

**5 of 9**
WIND BEAM CONNECTIONS DETAILS

NOTES:
1. Use Button or Flat Head Bolts. Nut may be used in lieu of Flat Washer under Head and Washer under Flat Washer for varying Column (Post) diameters.
2. Use Nylon washers (provided by the sheeting supplier) under the button bolt heads to protect sign sheeting.
3. Slots up to 2" long are allowed in wind beams to accommodate U-Bolts for varying Column (Post) diameters.
4. Wind beams may be oriented in either direction.
5. For rectangular signs greater than 66" install a third wind beam evenly spaced between the top and bottom wind beams. For rectangular signs up to 12" in height, use only one wind beam at each sign.

SINGLE SIGN DETAIL

VIEW A-A

BACK-TO-BACK SIGN DETAIL
### Single Column Ground Signs

#### Business:

- Size: \(30 \times 24\)
- Area: 7.19 SF
- Total Area: 12.03 SF
- Centroid: 2.19 SF
- 2.95 Ft.

- Size: \(30 \times 24\)
- Area: 7.19 SF
- Total Area: 12.03 SF
- Centroid: 2.19 SF
- 2.95 Ft.

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- Total Area: 12.03 SF
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- 2.95 Ft.
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<thead>
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<th>Area</th>
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<th>Centroid</th>
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<tr>
<td>30x24</td>
<td>5.00 SF</td>
<td></td>
<td>1.27 Ft.</td>
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<tr>
<td>18x18</td>
<td>1.71 SF</td>
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<td>0.57 Ft.</td>
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<tr>
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<td>2.19 SF</td>
<td>21x15</td>
<td>1.22 Ft.</td>
</tr>
<tr>
<td>24x24</td>
<td>3.03 SF</td>
<td></td>
<td></td>
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<tr>
<td>30x30</td>
<td>4.76 SF</td>
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<td>21x15</td>
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<tr>
<td>24x24</td>
<td>3.03 SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30x30</td>
<td>4.76 SF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GENERAL NOTES:
1. Refer to Index 700-010 for additional notes, assembly of base connection and material specifications not given in this Index.
3. Place galvanized steel shims between the Sleeve and Post to obtain a tight fit between the Post and Sleeve.
4. Wind Beam and Vertical Brace: Aluminum Z 3 x 2 1/2 x 3.38. Install Vertical Brace on 7'-0" to 8'-0" signs only.
5. Provide 2 ~ 0.0149" Thick (28 gauge) and 2 ~ 0.0329" Thick (21 gauge) Brass Shims Per Post. Used brass shims to plumb the post.
6. Use nylon washers under the button bolt heads to protect sign sheeting. Use aluminum washers under nut.

COLUMN SELECTION AND FOOTING SIZE TABLE

<table>
<thead>
<tr>
<th>Sign Size</th>
<th>Column Size Diameter x Thickness</th>
<th>Sleeve Size Diameter x Thickness</th>
<th>U-bolt Diameter</th>
<th>Base Bolt Diameter x Length</th>
<th>Torque lbs./ft</th>
<th>Base Plate Diameter x Thickness</th>
<th>Footing Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-0&quot; x 5'-0&quot;</td>
<td>4 NPS Schedule 80 (4.5&quot; x 0.337&quot;)</td>
<td>5 NPS Schedule 120 (5.562&quot; x 0.5&quot;)</td>
<td>1/2&quot;</td>
<td>1/4&quot; x 3/8&quot;</td>
<td>270</td>
<td>75</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>4'-0&quot; x 6'-0&quot;</td>
<td>4 NPS Schedule 80 (5.562&quot; x 0.337&quot;)</td>
<td>6 NPS Schedule 80 (6.625&quot; x 0.432&quot;)</td>
<td>1/2&quot;</td>
<td>3/8&quot; x 1&quot;</td>
<td>443</td>
<td>75</td>
<td>6'-0&quot;</td>
</tr>
</tbody>
</table>

TYPICAL SECTION

SIGN DETAIL

VIEW A-A

SECTION B-B

SECTION C-C
NOTES:
1. Work with Index 700-010.
2. Shop Drawings: Not required.

Materials:
A. Steel Pipe: ASTM A36 or ASTM A500 Grade 36
B. Steel Pipe (Support Post): ASTM A530 Schedule 40
C. Aluminum Pipe: ASTM B429 Alloy 6061-T6
D. Galvanized U-Bolts, Nuts and Plate Washers
   a. U-Bolts: ASTM A449
   b. Hex Nuts: ASTM A 563 Lock Nuts
   c. Plate Washer: ASTM A 36 or ASTM A500 Grade 36 or 50
E. Galvanized anchor bolts, nuts and washers
   a. Anchor Rod: ASTM F1554 Grade 55 fully threaded (for Adhesive Anchors)
   b. Anchor Bolts: ASTM F1554 Grade 55 Grade A Hex
   c. Nuts: ASTM A563 Heavy Hex Locking
   d. Washers: ASTM F436
F. Adhesive Anchor Bonding Material: Specification 931 Type HF Adhesive.
G. Weld Material: E70XX
H. Snap-In Post Cap: UV and weather-resistant glass-filled polyester cap

4. Coating:
   A. U-Bolts, Threaded Rods, Nuts and Washers: ASTM F2329
   B. Other Steel: ASTM A123

5. Fabrication:

Construction:
A. Locate Sign Support a minimum of 5 feet from an open joint or transition (sign stationing may be adjusted to accommodate this requirement.
B. Base plate must be flush with back of Traffic Railing
C. Anchors in Traffic Railings:
   a. Install Adhesive Anchors in accordance with Specification 416 except perform field test on one anchor per sign support location.
   b. Use templates and tie anchors as necessary to maintain correct placement of C-1-P Embedded Anchors
   c. Do not drill into existing conduit
D. Temporary Signs on Permanent Traffic Railings: Same as Permanent except Field testing of anchors is not required.

6. Removal of Temporary Signs on Permanent Traffic Railings:
A. Cut anchor rods flush with the top of the traffic railing
B. Coat anchors with Type F-1 epoxy to prevent corrosion
   a. Extend coating 2 inches beyond edge of cut anchor rods
   b. Epoxy coating 1/32" thick minimum

7. Payment:
Include the cost of all materials and labor in the cost of the single post sign assembly.

SIGN LIMITATIONS TABLE

<table>
<thead>
<tr>
<th>SIGN AREA (SF)</th>
<th>MAX. SIGN CENTROID HEIGHT (DIM. A + DIM. C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>9-1/2</td>
</tr>
</tbody>
</table>

Dimension A = Distance from centerline of the Support Post to the bottom of the sign or sign cluster.

Dimension C = Vertical distance from the bottom of the sign or sign cluster to the centroid of the sign or sign cluster.

---

1. Work with Index 700-010.
2. Shop Drawings: Not required.
NOTES:

1. Existing Traffic Railings:
   A. Locate existing conduit prior to drilling and adjust placement of base plate as necessary to avoid damaging existing conduit. Base plate must be flush with back of traffic railing. Maintain a minimum cover 2” from face of traffic railing to tip of Adhesive Anchor.
   B. For concrete parapets less than 12” thick, through bolt 1/2” Ø Hex Head Bolts with Nuts and Washers in lieu of Adhesive Bonded Anchors. Bolt heads shall not protrude more than 1/8” beyond traffic face of railing.
   C. For through bolting, countersink the nut and washer so that the bolt and nut does not extend beyond the face of the traffic railing. Do not exceed a countersinking depth and diameter of 2/3.

2. New Traffic Railings:
   A. Optional Couplers are shown for slipforming; keep Anchor Mall coupler threads free of concrete.
   B. For concrete parapets less than 10” thick, through bolt 1/2” Ø Hex Head Bolts with Nuts and Washers in lieu of Adhesive Bonded Anchors. Bolt heads shall not protrude more than 1/8” beyond traffic face of railing.
   C. For through bolting, countersink the nut and washer so that the bolt and nut does not extend beyond the face of the traffic railing. Do not exceed a countersinking depth and diameter of 2/3.

3. 36° Single-Slope Traffic Railing shown, other Traffic Railings and Parapets are similar.

4. Bridge Deck shown, Approach Slab and Retaining Wall are similar.

5. Sign or Sign Cluster:
   P” NPS Schedule 40 Aluminum

DESCRIPTION:

SINGLE POST BRIDGE MOUNTED SIGN SUPPORT

INDEX

FY 2019-20

STANDARD PLANS

SHEET

11/01/17

REV 01/01/17

REV

1 2 3

LAST

0 0 0 9

PM

REV

1 0 1 8

REV

0 0 0 9

PM
NOTES:
1. Work with Index 700-010.
2. Shop Drawings: Not required.
3. Materials:
   A. Steel Plate: ASTM A36 or ASTM A572 Grade 50
   B. Steel Pipe (Support Post): ASTM A53 Grade B Schedule 40
   C. Galvanized U-Bolts, Nuts, and Washer
      a. U-Bolts: ASTM A449
      b. Hex Nuts: ASTM A 563 Lock Nuts
   D. Galvanized Anchor Bolts, Nuts and Washers:
      a. Anchor Rod: ASTM F1554 Grade 50 Fully Threaded (for Adhesive Anchors)
      b. Nut: ASTM F1554 Grade 50 Grade A Hex
      c. Nuts: ASTM A325 Heavy Hex Locking
      d. Washers: ASTM A567
   E. Adhesive Anchor Bonding Material: Specification 937 Type IV Adhesive
   F. Weld Material: E7014
   G. Snap-In Post Cap: UV and weather-resistant glass-filled polyester cap
4. Coating:
   A. U-Bolts, Threaded Rods, Nuts and Washers: ASTM F2329
   B. Other Steel: ASTM A123
5. Fabrication:
   A. Weld: Specification 460-6.4
   B. Not dip galvanize after fabrication
6. Construction:
   A. Locate Sign Support a minimum of 5 feet from an open joint or transition (sign stationing may be adjusted to accommodate this requirement)
   B. Anchor Bolts must be flush with the top of Railing
   C. Anchors in Traffic Railings:
      a. Install Adhesive Anchors in accordance with Specification 416 except perform field test on one anchor per sign support location
      b. Use templates and cut anchors as necessary to maintain correct placement of C-I-P Embedded Anchors
      c. Do not drill into existing reinforcing
   D. Temporary Signs on Permanent Traffic Railings, Same as Permanent except field testing of anchors is not required
   E. Temporary Signs on Temporary Railings/Barrier:
      a. Install Sign Supports at the midpoint along the length of a single segment
      b. Avoid drilling through existing reinforcement; use of metal detector not required
      c. Field testing of anchors is not required
7. Removal of Temporary Signs on Permanent Traffic Railings:
   A. Cut anchor rods flush with the top of the railing
   B. Coat anchors with Type I-I epoxy to prevent corrosion
   a. Exceed coating 2 inches beyond edge of cut anchor rods
   B. Epoxy coating 1/16" thick minimum
   C. Use Field indicators to monitor the length of the anchor rods
8. Payment:
   Include the cost of all materials and labor in the cost of the single post sign assembly.

<table>
<thead>
<tr>
<th>TABLE 1 - SIGN PANEL AND POST SIZING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Signs</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Permanent Signs</td>
</tr>
</tbody>
</table>

Include the cost of all materials and labor in the cost of the single post sign assembly.
NOTES:
1. Place anchor rods in a staggered or linear pattern as necessary to avoid reinforcing.
2. Use a staggered pattern for all temporary barriers.

### TABLE 2: BASE PLATE TYPE AND ANCHOR ROD SIZING

<table>
<thead>
<tr>
<th>Index</th>
<th>Type/Application</th>
<th>Base Plate Type</th>
<th>Anchor Rod Ø</th>
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</thead>
<tbody>
<tr>
<td>521-001</td>
<td>Full Wall</td>
<td>B</td>
<td>1&quot;</td>
</tr>
<tr>
<td>521-001</td>
<td>Cantilever or L-Wall</td>
<td>A</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>All listed above Plus 521-110 &amp; 521-100</td>
<td>C</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>Temporary Signs</td>
<td></td>
<td>1&quot;</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Place anchor rods in a staggered or linear pattern as necessary to avoid reinforcing.
2. Use a staggered pattern for all temporary barriers.

*Temporary Signs*
GENERAL NOTES:

1. Verify Column lengths in the field prior to fabrication.

2. Shop drawings:
   A. Sign Support Shop drawings are not required when fabricated in accordance with this Index and support columns do not exceed the length shown in the plans by more than 2'-0".
   B. Sign Panels: Horizontal panel splices are allowed at interior wind beams for sign panels with a depth ("D") greater than 18 feet. Shop drawings required for horizontal panel splice details.
   C. When shop drawings are required, obtain approval prior to fabrication.

3. Materials:
   A. Sign Panel Mounting Materials:
      a. Aluminum Bars, and Extruded Shapes: ASTM B221, Alloy 6061-T6 or Alloy 6351-T5
      b. Aluminum Structural Shapes: ASTM B308, Alloy 6061-T6
   B. Sign Support Structure Materials:
      a. Steel Plates and Structural Shapes: ASTM A36 or ASTM A399, Grade 36
      b. Steel Weld Metal: E70XX
      c. Shims: Brass ASTM B36, or Galvanized Steel
   C. Aluminum Bolts, Nuts, and Washers:
      a. Flat Head and Button Head Bolts: ASTM F 468, Alloy 2024-T4
      b. Hex Nuts: ASTM F3125, Grade A325, Type 1
      c. Washers: ASTM B221, Alloy 2024-T4
   D. Stainless Steel Bolts, Nuts and Washers: DIN 962 Standard
   E. All Base Connections and Stub Column materials are steel unless otherwise specified.

4. Fabrication:
   A. All Base Connections and Stub Column materials are steel unless otherwise specified.
   B. Drill or sub-punch and ream holes in Fuse Plates and Hinge Plates
   C. Weld Base Plate to Post & Stub or if using the Alternate Connection Detail weld Base Plate and Stiffeners to Post and Stub (Sheet 2)
   D. Hot dip galvanize After fabrication. Remove all drips, runs or beads on base plate within washer contact areas (including saw cuts)

5. Construction:
   A. Install the Sign Structure foundation in accordance with Specification 455. Orient Stub Post according to direction of traffic (Sheet 2)
   B. Drill three flat washers per bolt (See Base Connection Details, Sheet 2) Tighten Base Bolts in accordance with Instructions Notes on Sheet 2.

Materials & Specifications:

- **Concrete**: Class I.
- **Steel Plates and Structural Shapes**: ASTM A36 or ASTM A709, Grade 36
- **Stainless Steel Bolts, Nuts and Washers**: DIN 962 Standard
- **Aluminum Bolts, Nuts and Washers**:
  - a. Flat Head and Button Head Bolts: ASTM F 468, Alloy 2024-T4
  - b. Hex Nuts: ASTM F3125, Grade A325, Type 1
  - c. Washers: ASTM B221, Alloy 2024-T4
- **Aluminum Fasteners**: Anodic coating (0.0003 inches min.) and chromate sealed
- **Galvanize High Strength Steel Bolts, Nuts and Washers**: ASTM F3125
- **Galvanize All Other Steel Materials** (excluding stainless steel):
  - a. Galvanized Hex Head Bolts: ASTM F3125, Grade A325, Type 1
  - b. Galvanized Nuts: ASTM A563 Hex, Grade DH
  - c. Galvanized Washers: ASTM F436
- **Concrete**: Class I.
- **Welding**:
  - a. Steel Plates and Structural Shapes: E70XX
  - b. Aluminum Structural Shapes: ASTM B308, Alloy 6061-T6
  - c. Aluminum Bars, and Extruded Shapes: ASTM B221, Alloy 6061-T6 or Alloy 6351-T5
- **Weld Metals**:
  - a. Steel: E70XX
  - b. Aluminum: 2024-T4
  - c. Copper: 0.005" Min.

**Notes**:

- **Base Connections**:
  - a. Bolts: ASTM F3125, CW1 or SH1
  - b. Nuts: ASTM F594, Grade A325
  - c. Washers: ASTM B221, Alloy 6061-T6
- **Foundation**:
  - a. Galvanized Washers: ASTM F436
  - b. Galvanized Nuts: ASTM A563 Hex, Grade DH
  - c. Galvanized Bolts: ASTM F71

**Coatings**:

- **Aluminum**:
  - a. substrate coating: chromate sealed (1.0-2.0 mils)
  - b. Anodic coating (0.0003 inches min.) and chromate sealed

**Standard Plans**

- **Standard Plans Index**
  - a. FY 2019-20
  - b. Multi-Column Ground Sign

**State of Florida**

- **Welcome Center**
- **Multi-Column Sign Assembly**
**GENERAL NOTES**

1. Work this Index with Index 700-040 and 700-041.

2. The number and location of the Panel Splices are determined by the Sign Face supplier.

3. Spacing of Vertical Hangers:

   A. Two Vertical Hangers = 21.0% L
   B. Three Vertical Hangers = 15.0% L
   C. Four Vertical Hangers = 11.0% L
   D. Five Vertical Hangers = 9.0% L
   E. Six Vertical Hangers = 7.0% L

4. Spacing of Wind Beams:

   A. Two Wind Beams = 21.0% D
   B. Three Wind Beams = 18.0% D
   C. Four Wind Beams = 15.0% D
   D. Five Wind Beams = 12.0% D
   E. Six Wind Beams = 9.0% D

5. Shop Drawings:

   A. Required for Sign Panels deeper than 10'-0" with a horizontal panel splice.
   B. Splice must be located in between interior Zee Supports and only allowed on signs greater than 10'-0".

6. Materials:

   A. Aluminum:
      a. Bars, and Extruded Shapes: ASTM B 221, Alloy 6061-T6 or Alloy 6351-T5
      b. Structural Shapes: ASTM B 606, Alloy 6061-T6
      d. Washers: ASTM B 221, Alloy 6061-T6
   B. Steel:
      a. U-Bolts: ASTM A 449 or ASTM A 193
      b. Nuts: ASTM A 563, 2 per leg
      c. Washers: ASTM A 564, Flat Washers
   C. Coatings:
      a. Aluminum Bolts, Nuts and Washers: Aodic (0.0003 inches max) and chromate sealed.
      b. Galvanized Steel Bolts, Nuts and Washers: ASTM F 2329
      c. Wind Speed by county: see Index 715-010.

**WIND BEAM TABLE (Z 3 x 2\% x 2.33)**

<table>
<thead>
<tr>
<th>Number of Horizontal Wind Beams Based on Sign Depth (D)</th>
<th>2 Beams</th>
<th>3 Beams</th>
<th>4 Beams</th>
<th>5 Beams</th>
<th>6 Beams</th>
</tr>
</thead>
<tbody>
<tr>
<td>D ≥ 5</td>
<td>ø D × ø 8</td>
<td>ø D × ø 12</td>
<td>ø D × ø 15</td>
<td>ø D × ø 18</td>
<td></td>
</tr>
</tbody>
</table>

**HANGER TABLE (1 6 x 4.69 or Z 3 x 3\% x 6.19)**

<table>
<thead>
<tr>
<th>Number of Vertical Hanger Beams Based on Wind Speed and Sign Length (L)</th>
<th>2 Hangers</th>
<th>3 Hangers</th>
<th>4 Hangers</th>
<th>5 Hangers</th>
<th>6 Hangers</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 mph</td>
<td>L = 20</td>
<td>L = 30</td>
<td>L = 40</td>
<td>L = 50</td>
<td>L = 60</td>
</tr>
<tr>
<td>150 mph</td>
<td>L = 18</td>
<td>L = 27</td>
<td>L = 35</td>
<td>L = 45</td>
<td>L = 55</td>
</tr>
<tr>
<td>170 mph</td>
<td>L = 15</td>
<td>L = 22</td>
<td>L = 30</td>
<td>L = 40</td>
<td>L = 50</td>
</tr>
</tbody>
</table>

**NOTE:** For Monroe County designs, use 170 mph values but with Z 3 x 3\% x 6.19 vertical hanger beams only.

**WIND AND HANGER BEAMS FOR OVERHEAD SIGNS**
PLACEMENT OF SIGN LIGHTS

1. This Index details a bottom luminaire support structure. For signs requiring top luminaire support structures, the detail can be reversed.

2. Luminaire spacing and arm length is shown on Guide Sign Worksheet.

3. The Guide Sign Worksheet indicates the sign luminaire used for the basis of design. The contractor may propose a different luminaire by submitting photometric calculations for each lighted sign for review by the Engineer.

SIGN LIGHTING INSTALLATION

Roadway Lighting included in contract:

1. Power for the sign lighting provided from the roadway lighting circuit.

2. Indicate sign location and a pull box location for connection to the sign lights in the lighting plans.

3. Lighting contractor installs pull box and loop 2' of lighting circuit conductors in the pull box for connection by the signing contractor.

4. Signing contractor furnishes and installs the luminaires, NEMA 3R enclosure, 30 amp breaker, conduit, conductors and all other electrical equipment necessary for connection to the lighting circuit.

Roadway Lighting not included in contract:

1. Signing plans include the pay item numbers to furnish and install conduit, conductors, ground rods, pull boxes and service point equipment.

2. Signing plans indicate the location of the service point equipment and circuit runs.

3. Signing contractor provides all electrical equipment necessary for connection of the sign lights.

Roadway Lighting not included in contract:

1. Power for the sign lighting provided from the roadway lighting circuit.

2. Indicate sign location and a pull box location for connection to the sign lights in the lighting plans.

3. Lighting contractor installs pull box and loop 2' of lighting circuit conductors in the pull box for connection by the signing contractor.

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Roadway Lighting not included in contract:

1. Signing plans include the pay item numbers to furnish and install conduit, conductors, ground rods, pull boxes and service point equipment.

2. Signing plans indicate the location of the service point equipment and circuit runs.

3. Signing contractor provides all electrical equipment necessary for connection of the sign lights.
NOTES:
1. Work this Index in conjunction with CANTILEVER SIGN STRUCTURE DATA TABLES in the Plans and Index 700-030.
2. Handholes are required at pole base for DNS Structures. Refer to Index 700-090 for Handhole Details.
3. Shop Drawings are required:
   - Obtain Shop Drawing approval prior to fabrication. Include the following:
     A. Upright Pipe height ('A') and Foundation elevations. Verify dimension in the field prior to submittal to ensure minimum vertical clearances of the sign panel over the roadway.
     B. Height of the foundation above adjacent ground.
     C. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
     D. Chord Splices
     E. Handholes at pole base (when required).
4. Materials:
   - A. Sign Structure:
     - Upright and Chords (Steel Pipe): API 5L, X42 PSL2, 42 ksi yield (or ASTM A606, Grade 80 Wire)
     - Steel Angles and Structural Plates and Bars: ASTM A709 Grade 36
     - Wood Material: F75X
   - B. Bolts, Nuts and Washers:
     - Upright Splices: Not allowed
     - Structural bolt hole diameters: Bolt diameter plus 11/16
     - Anchor bolt hole diameters: Bolt diameter plus 3/8
     - Anchor bolt hole diameters: Bolt diameter plus 1/4
     - Structural bolt hole diameters: Bolt diameter plus 1/16
     - Anchor bolts: ASTM F1554 Grade 55
     - Anchor bolts: ASTM F7534 Grade 55
     - Nuts: ASTM A563 Grade DH Heavy-Hex
     - Washers: ASTM F436 Type 1, one under turned element
     - Washers: ASTM A36
   - C. Anchor Bolts, Nuts and Washers
     - Anchor Bolts: ASTM F7534 Grade 55
     - Nuts: ASTM A563 Grade A Heavy-Hex (5 per bolt)
   - D. Concrete
     - Spreader Foundation Concrete: Class IV
   - E. Rebar:
     - Reinforcing Steel: Specification 415
   - F. Hot Dip Galvanize after fabrication.
   - G. Shop assemble the entire structure after galvanizing to validate/document alignment and clearance for bolted connections as well as contact between connecting plates. Take remedial action, if necessary, prior to shipment.
   - H. Disassemble, as necessary, and secure components for shipment.
5. Fabrication:
   - A. Welding: Specification 460-6.4
   - B. Chord Splices: "SD" panel from upright is the closest panel in which a chord splice may be used. See Plans for CANTILEVER SIGN STRUCTURE DATA TABLE. Minimum splice spacing is two truss panel lengths apart.
   - C. Upright Splices: Not allowed
   - D. Structural bolt hole diameters: Bolt diameter plus 11/16
   - E. Anchor bolt hole diameters: Bolt diameter plus 3/8
6. Coatings:
   - A. Bolts, Nuts and Washers: ASTM F3329
   - B. All other steel, including Plate Washers, hot dip galvanize: ASTM A123
7. Construction:
   - A. Construct foundation in accordance with Specification 45S, except payment is included in the cost of the structure.
   - B. Prior to erection, record the as-built anchor locations and submit to the Engineer.
   - C. Place backfill above spread footings prior to installation of the sign panels. Do not remove or reduce backfill without prior approval of the Engineer.
   - D. Tighten nuts and bolts in accordance with Specification 700.
   - E. Install Aluminum Sign Panels as shown in the Plans.
   - F. Place structural grout pad with drain between top of foundation and bottom of backfill in accordance with Specification 649-2.
   - G. Place backfill above spread footings prior to installation of the sign panels. Do not remove or reduce backfill without prior approval of the Engineer.
   - H. Disassemble, as necessary, and secure components for shipment.
8. Notes:
   - A. Upright Pipe height ('A') and Foundation elevations: Verify dimension in the field prior to submittal to ensure minimum vertical clearances of the sign panel over the roadway.
   - B. Height of the foundation above adjacent ground.
   - C. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
   - D. Chord Splices
   - E. Handholes at pole base (when required).
9. Materials:
   - A. Sign Structure:
     - Upright and Chords (Steel Pipe): API 5L, X42 PSL2, 42 ksi yield (or ASTM A606, Grade 80 Wire)
     - Steel Angles and Structural Plates and Bars: ASTM A709 Grade 36
     - Wood Material: F75X
   - B. Bolts, Nuts and Washers:
     - Upright Splices: Not allowed
     - Structural bolt hole diameters: Bolt diameter plus 11/16
     - Anchor bolt hole diameters: Bolt diameter plus 3/8
     - Anchor bolt hole diameters: Bolt diameter plus 1/4
     - Structural bolt hole diameters: Bolt diameter plus 1/16
     - Anchor bolts: ASTM F1554 Grade 55
     - Anchor bolts: ASTM F7534 Grade 55
     - Nuts: ASTM A563 Grade DH Heavy-Hex
     - Washers: ASTM F436 Type 1, one under turned element
     - Washers: ASTM A36
   - C. Anchor Bolts, Nuts and Washers
     - Anchor Bolts: ASTM F7534 Grade 55
     - Nuts: ASTM A563 Grade A Heavy-Hex (5 per bolt)
   - D. Concrete
     - Spreader Foundation Concrete: Class IV
   - E. Rebar:
     - Reinforcing Steel: Specification 415
   - F. Hot Dip Galvanize after fabrication.
   - G. Shop assemble the entire structure after galvanizing to validate/document alignment and clearance for bolted connections as well as contact between connecting plates. Take remedial action, if necessary, prior to shipment.
   - H. Disassemble, as necessary, and secure components for shipment.
NOTES:

1. Construction joint allowed, roughen surface to \( \frac{1}{4} \)" minimum amplitude prior to pour.

2. See Traffic Plans for elevation at top of Foundation.

3. Install Drilled Shaft with a 2'-0" minimum from top elevation of the drill shaft to the finished grade, unless specified otherwise in the plans.

4. The shaft length is based on 2'-0" height above finished grade.

5. Structural Grout Pad dimension may be modified to be less than 3" where the footprint of the Structural Grout Pad does not provide adequate clearance for accessibility considerations.

6. Wrap fillet weld around the stiffener termination on the tube wall.
SECTION A-A

(With Gusset Plates and Web Angles Omitted For Clarity)

NOTE:
1. Wrap fillet weld around the stiffener termination on the tube wall.
2. Truss Chord Bolts:
   A. Top and Bottom, Install 'TC' hex head bolts.
   B. Back, Install 'TB' hex head bolts.
TRUSS NOTES:
1. Out-of-plane members are not shown for clarity.
2. Wrap fillet weld around plate termination on the tube wall.
3. Chord Splices not shown.

BOLT SIZES:

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>1&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>2½&quot;</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>2¼&quot;</td>
</tr>
</tbody>
</table>

Parallel to Plane Of View Plate Is Skewed

TO PLANE OF VIEW

Gusset (Typ.)

DETAIL 'D'

DETAIL 'E'

DETAIL 'F'

Truss Web Angles (Typ.)

See Upright-Truss Connection Detail (Sheet 3)

'GA' Ø Hex Head Bolts

'GB' Ø Hex Head Bolts

CANTILEVER SIGN STRUCTURE
SPLICE CONNECTION NOTES:
1. Only 6 bolts are shown in detail for clarity. (One Half Each Side Of Splice)
2. Splices are not permitted for trusses less than or equal to 40', Splice optional for trusses greater than 40'.

TRUSS PLUG DETAIL

UPRIGHT CAP DETAIL
NOTES:
1. Work this Index in conjunction with SPAN SIGN STRUCTURE DATA TABLES in the Index 700-020.
2. Handholes at the pole base are required for DMS Structures. Refer to Index 700-090 for Handhole Details.

3. Shop Drawings are required:
   a. Obtain Shop Drawing approval prior to fabrication. Include the following:
      i. Upright Pipe height (C & B) and Foundation elevations: Verify minimum vertical clearances of the sign panel over the roadway.
      ii. Height of the foundation above adjacent ground.
      iii. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
   b. Method to be used to provide the required parabolic camber (see Camber Diagram).
   c. Handholes at pole base (when required).

4. Materials:
   a. Sign Structure:
      i. Upright and Chords (Steel Pipe): A106 L, A500, Grade B (Min.)
      ii. Steel Angles and Plates: ASTM A509 grade 36
      iii. Weld Material: E70XX
   b. Bolts, Nuts and Washers:
      i. High Strength Bolts: ASTM F3123, Grade A325, Type 1
      ii. Nuts: ASTM A563, Grade DH Heavy-Hex
      iii. Washers: ASTM A959, Type 1, one under turned element
      iv. Anchor bolts, nuts and washers: ASTM A490, Grade 56
      v. Upright Washers: ASTM A563 Grade A Heavy-Hex (5 per bolt)
      vi. Plate Washers: ASTM A563 Grade A (2 per bolt)
   c. Concrete: Class IV (Drilled Shaft)

5. Fabrication:
   a. Welding: Specification 460-6.4
   b. Chord Splices: Minimum splice spacing is three truss panel lengths apart and three truss panel lengths from the uprights.
   c. Upright splice: Not allowed
   d. Structural bolt hole diameters: Bolt diameter plus 0.062".
   e. Anchor bolt hole diameters: Bolt diameter plus 0.062".
   f. Hot Dip Galvanize after fabrication.
   g. Shop assemble the entire structure after galvanizing to validate/document alignment and clearance for bolted connections as well as contact between connecting plates. Take remedial action, if necessary, prior to shipment.
   h. Disassemble as necessary and secure components for shipment.

6. Coatings:
   a. Anchor Bolts, Nuts and Washers: ASTM F1554
   b. Upright and Chords (Steel Pipe): A106 L, A500, Grade B (Min.)
   c. Washers: ASTM F436, Type 1, one under turned element
   d. Structural steel: ASTM A709 Grade 50, ASTM A500, Grade B (Min.)

7. Construction:
   a. Construct foundation in accordance with Specification 455 Drilled Shaft, except payment is included in the cost of the structure.
   b. Prior to erection, record the as-built anchor locations and submit to the Engineer.
   c. Provide a parabolic camber with the required upward deflection as shown on the Camber Diagram.
   d. Tighten nuts and bolts in accordance with Specification 700.
   e. Disassemble as necessary and secure components for shipment.
   f. After installation, space wire screen between top of Foundation and bottom of Baseplate in accordance with Specification 649-6.
NOTES:

1. See Traffic Plans for elevation at top of Foundation.

2. Install Drilled Shaft with a 2'-0" minimum from top elevation of the drill shaft to the finished grade, unless specified otherwise in the plans.

3. The shaft length is based on 2'-0" height above finished grade.

4. Wrap fillet weld around the stiffener termination on the tube wall (Typ).

1. See Traffic Plans for elevation at top of Foundation.

2. Install Drilled Shaft with a 2'-0" minimum from top elevation of the drill shaft to the finished grade, unless specified otherwise in the plans.

3. The shaft length is based on 2'-0" height above finished grade.

4. Wrap fillet weld around the stiffener termination on the tube wall (Typ).
SPAN SIGN ASSEMBLY

UPRIGHT-TRUSS CONNECTION DETAIL

NOTES:
1. Wrap fillet weld around the stiffener termination on the tube wall.
2. Truss Chord Bolts: "LB" or "RB" Hex Head Bolts "LA" or "RA".
3. Right Upright Truss connection shown, Left Upright Truss connection similar.
NOTES:
1. Out-of-plane members are not shown for clarity.
2. Back truss chord and attached angles are not shown for clarity.
3. Wrap fillet weld around plate termination on the tube wall.

<table>
<thead>
<tr>
<th>Bolt Diameter (in.)</th>
<th>Distance (in.)</th>
<th>EA</th>
<th>EB</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{4} )</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>1</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>( \frac{3}{8} )</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>( \frac{1}{2} )</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

SPAN SIGN ASSEMBLY
1. Free-swinging, internally-illuminated street signs shall only be installed on the signal pole for span wire assemblies. For mast arm assemblies the street sign may be installed on the arm or pole.

2. Free-swinging, internally-illuminated street signs meet the requirements of Specification 700.

3. Pole attachments and cantilever arm (or truss) assemblies may be accepted by Contractor certification provided the signs being supported meet the weight and area limitations included in Section 700 for "Acceptance by Certification".

4. Pole attachments and cantilever arm (or truss) assemblies supporting signs not meeting the weight or area limitations included in Specification 700 for "Acceptance by Certification" require the submittal of structural calculations and Shop Drawings that have been prepared by and sealed by the Specialty Engineer.
GENERAL NOTES:
1. Work this Index with Specification 700.
2. Furnish and install the Dynamic Message Sign (DMS), sign structure in accordance with Index 700-040 or 700-041. Locate foundations at locations shown in the Plans.
3. Shop Drawings are required:
   a. Include the DMS connection.
   b. Catwalk design in accordance with AISC, AASHTO, and OSHA requirements as applicable.
   c. Do not start fabrication until the shop drawings are approved.
   d. Extend Catwalk from DMS to outer edge of paved shoulder and not less than 4 feet in length.
4. If required, install guardrail at location show in the Plans and in accordance with index 536-001.
5. Materials:
   a. Sign Mounting Components:
      i. Aluminum Structural Shapes: ASTM B308, Alloy 6061-T6
      ii. Vertical Hangers: ASTM A414, Grade 70
      iii. U-Bolts: ASTM A449 or A193 B7
      iv. Steel Bolts, Nuts, and Washers:
         1. High Strength Bolts: ASTM F3125, Grade A325, Type 1
         2. Nuts: ASTM F563
         3. Washers: ASTM F463 (Flat Washer)
   b. Coatings:
      i. All nuts, bolts and washers ASTM F2329
      ii. All other steel items ASTM A123
      iii. Bolt hole Diameters: Bolt plus 1/2" before galvanizing
5. Installation:
   a. See project requirements for location of DMS Cabinet.
   b. Field Adjust pole-mounted DMS cabinet height to achieve best access for maintenance personnel given site condition as directed by the Engineer. Avoid conflicts with stiffeners, handholes and maintenance of anchors bolts.
   c. Locate the sign horizontal on the structure as shown in the Plans. Vertically center the sign enclosure with the centerline of the truss.
   d. Before erection, field drill the bolt holes in the vertical hangers and horizontal mounting member attached to the sign enclosure. Field locate holes to allow vertical hanger placement as shown on the Plans with no conflicts with gusset or splice plates.
   e. Locate threaded couplings on sign side of upright above the sign truss.
   f. Connect grounding conductors to the steel framework that has been cleaned to base metal by use of bonding plates, having contact area of not less than 8 square inches or by welding or brazing. Drilling and tapping the steel structure to accept a threaded connector is also an acceptable method.
   g. If steel framework is to be drilled and tapped to accept threaded connector, the threaded connector shall be galvanized and have at least 3 threads fully engaged and secured with a jam nut to the steel framework.
   h. Bends in the conduit must be greater than the minimum bending radius for the cable contained in the conduit.
   i. Completely encase all data, fiber optic and power cables for the DMS within the sign structure or in conduit.
   j. Completely encase all data, fiber optic and power cables for the DMS within the sign structure or in conduit.
   k. Transition conduit in foundation to indicate underground conduit with appropriate reducer outside the limit of the foundation.

DYNAMIC MESSAGE SIGN ASSEMBLY
NOTE: Actual number and direction of travel lanes varies.
**REVISION DESCRIPTION:**

- **LAST REVIEW:** 01/01/17
- **STANDARD PLANS:** FY 2019-20
- **DYNAMIC MESSAGE SIGN WALK-IN**

**DETAIL "B"**
- Primary Ground Rod A
- Primary Ground Rod B
- 20' Radius Each "Sphere of Influence"

**DETAIL "C"**
- 20' Rods, 40' Spacing
- Sign Structure Foundation

**GROUND ROD ARRAY DETAIL**
- Typical (20' Rods, 40' Spacing)

**DETAIL "D"**
- Tack Welded Cover Clip (Typ.)
- Full Penetration Weld

**DETAIL "E"**
- Pole
- Partial Penetration Weld (Typ.)

**SECTION A-A**
- 11 Gage Handhole Cover
- 1/4" Stainless Steel Hex Head Screw (Typ.)
Description:

**HANGER LOCATION DETAIL**

Vertical Hanger Spacing 9'-0" (Max.)

Quantities and Spacing of the members will be dictated by locations of truss connection plates, splices and 9'-0" (Max.) Spacing

2-" Threaded Couplings

2-½" Ø U-Bolts With Holes For ½" Ø Bolts With Nuts and Washers

Double Nuts and Washers

Provide 2-½" Ø Bolts

Field Drill Holes And

Top Truss Chord

Bottom Truss Chord

See Truss Data Sheet

Vertical Hanger Galvanized W6x9 (Typ.)

Hanger @ 5' (Max.) Spacing

Vertical Hanger

Back Face Of DMS

Aluminum Zee Beam

Zee Beam

5'-0" (Max.)

Hanger Location Detail

SECTION B-B

SECTION C-C

SECTION D-D

(Dynamic Message Sign Structure Shown, Span Sign Structure Similar)
GENERAL NOTES:

1. Single-Column Signs Shown, Multi-Column Signs similar. These typical sections serve as a guide for locating the traffic signs required under various roadway conditions. For size and details of sign construction and footing, refer to the appropriate Index and Plans.

2. Verify the length of sign supports in the yield prior to fabrication.

3. Install ground signs at an angle of 1 to 4 degrees away from the traffic flow (see illustrations). Install shoulder mounted signs rotated clockwise and median mounted signs rotated counterclockwise. Install signs on a curve as noted above from the perpendicular to the motorist line of sight.

4. The setback for Stop and Yield signs may be reduced to 3 minimum from the Edge of Travelled Way if required for visibility in business or residential sections with no curb and speeds of 30 MPH or less.

5. The mounting heights are measured from the bottom of the sign panel to a horizontal line extended from the Edge of Travelled Way or from the ground surface at the back of curb. If the standard heights cannot be met, the minimum heights are as follows:
   - 7' - Expressway & Freeway Systems
   - 5' - Rural
   - 7' - Urban (including residential with parking and/or pedestrian activity)

Expressway and Freeway Systems:

- If a secondary sign is mounted below the major sign, mount the major sign so that the bottom of the sign is at least 8' above the edge of the traveled way and the secondary sign at least 5' above the edge of the traveled way.

Other Systems:

- Rural, mount the secondary sign at least 5' above the edge of the traveled way.
- Urban, mount the secondary sign at least 7' above the edge of the traveled way.

6. Do not install sign supports in the bottom of ditches.

7. Install sign supports so they do not reduce the accessible width of sidewalks or shared use paths to less than 4' clear width.

CASE I
Use On Mainline Freeways And Express Way Systems

CASE II
Use In All Rural, Freeways And Expressway Ramps

CASE III
Use On All Roads With Signs Mounted Behind Sidewalk

CASE IV
Use On All Rural, Freeway And Express Systems

CASE V
Use In Business Or Residential Areas Only

CASE VI
Use On All Roadway With Signs Behind Guardrail

CASE VII
Use On All Rural, Freeway And Express Systems

CASE VIII
Use On Island Or Curbed Median

CASE IX
Use On Interstate Marker

CASE X
Use On Interstate Exit Ramps

NOTE:
If width does not allow standard offset from both roadway, center sign in median.

NOTE:
14'-0" Lateral Offset on all freeway and expressway ramps.

NOTE:
Use In All Interstate Rural Roads, Freeways And Expressway Ramps

NOTE:
14'-0" Lateral Offset on all freeway and expressway ramps.

NOTE:
Use In All Interstate Rural Roads, Freeways And Expressway Ramps

NOTE:
For more information refer to Section 2H of the MUTCD.

NOTE:
For more information refer to Section 2H of the MUTCD.

NOTE:
If a secondary sign is mounted below the major sign, mount the major sign so that the bottom of the sign is at least 8' above the edge of the traveled way and the secondary sign at least 5' above the edge of the traveled way.

General Notes:

- Width of Sidewalks or Shared Use Paths to less than 4' min.
- Do not install sign supports in the bottom of ditches.
- Install sign supports so they do not reduce the accessible width of sidewalks or shared use paths to less than 4' clear width.
GUIDE SIGN USE

1 or 2 DIGITS

3 or MORE DIGITS

NOTES:
1. Florida marker shall have Black Legend with White Background.
2. Stroke width of State outline shall be 1/8" for Guide Sign.
4. 1/8" Border

INDEPENDENT USE FOR FREEWAY

INDEPENDENT USE OTHER THAN FREEWAY

NOTES:
1. Series D Legend.
2. Color: Yellow Legend and Border on Blue Background.
3. When used on a guide sign, marker must be overlaid on a rectangular Yellow Background as shown in chart.
4. When two or more County Route Markers are mounted together, use the dimensions of the largest marker for all other markers.

INDEX

SPECIAL SIGN DETAILS
No Obstruction To Text Or Symbols From Holes Or Bolts. Sign Mounting Holes Can Be Punched Or Field Drilled With No Obstruction To Text Or Symbols From Holes Or Bolts.

**FTP-65-06**

3 x 3
2" Radial \(\frac{1}{2}\)" Border
Series D Legend
White Legend and Border
Black Legend and Border


**FTP-66-06**

4 x 3
2" Radial \(\frac{1}{2}\)" Border
Series D Legend
White Legend and Border
Black Legend and Border


**FTP-67-06**

3 x 4
2" Radial \(\frac{1}{2}\)" Border
Series D Legend
Blue Background
White Legend and Border


**FTP-68A-06**

9" x 1'-3"
1.5" Radial \(\frac{1}{2}\)" Border
Series B Legend
White Background
Black Legend and Border


**FTP-68B-06**

9" x 1'-6"
1.5" Radial \(\frac{1}{2}\)" Border
Series B Legend
White Background
Black Legend and Border


**FTP-69-06**

2" x 2" x 3" Radial \(\frac{1}{2}\)" Border
Series D Legend
White Legend and Border
Black Legend and Border


**FTP-70-06**

3'-6" x 7'-6"
225° Radial \(\frac{1}{2}\)" Border
5" Series C and 7" Series C Legend (Yellow Background and Blue Background)
White Legend and Border


**FTP-71-06**

4" x 4" x 4"
2" Radial \(\frac{1}{2}\)" Border
5" Series C and 7" Series C Legend (Yellow Background and Blue Background)
White Legend and Border


**FTP-72-06**

3 x 3
2" Radial \(\frac{1}{2}\)" Border
8" Series C Legend (Yellow Background and White Legend)
Black Legend and Border


**FTP-73-06**

5'-6" x 2'-6"
2" Radial \(\frac{1}{2}\)" Border
8" Series D Legend (Blue Background and Black Legend)
White Legend and Border

VENDING FREE COFFEE

SAFETY BREAK

MACHINES

EVACUATION ROUTE

FTP-74-06
3'-0" X 2'-6"
4" Radii 1/2" Border
6" Series D Legend
White Legend and Blue Legend

FTP-75-06
5'-6" X 1'-3"
1" Radii
6" Series D Legend
Blue Background
White Legend

FTP-76-06
5'-6" X 1'-3"
1" Radii
8" Series D Legend
Blue Background
White Legend

FTP-77-06
3" X 9
5" Radii 1/4" Border
4" Series C Legend
White Background with Blue Circle Background
White Legend and Black Border

FTP-78-06
2" X 2"
2" Radii 1/2" Border
2" Series D Legend
White Background with Blue Circle Background
White Legend and Black Border

FTP-79-06
4" X 9
6" Radii 1/2" Border
6" and 12" Series D Legend
Top Yellow Background with Black Legend and Black Border
Bottom White Background with Black Legend and Border

FTP-80-06
3" X 8
5" Radii 1/2" Border
6" Series D Legend
Top Yellow Background with Black Legend and Black Border
Bottom White Background with Black Legend and Border

FTP-81-06
2" X 2'-6"
5" Radii 1/2" Border
6" and 10" Series D Legend
Top Yellow Background with Black Legend and Black Border
Bottom White Background with Black Legend and Border

FTP-82-08
2" X 2"
1.5" Radii
5" Series D Legend
White Background
Black Legend and Border

FTP-83-08
16" X 8" X 7'-9"
8" Radii
16" Series E Legend
Green Background
White Legend

FTP-84-09
5" X 5" X 1-3/4"
3/4" Radii
5" Series D Legend
Yellow Background
Black Legend and Border
**GENERAL NOTES**

1. Only those services meeting criteria established by the Department and approved by the State Traffic Operations Engineer for each interchange shall be shown. Symbol signs for motorist services shall always appear in the following order: reading from left to right and top to bottom: Gas, Food, Lodging, Phone *, Hospital, Camping.

2. Symbols shall appear consecutively on the sign with no positions left blank or reserved for intermediate symbols not currently approved for a particular interchange.

3. All motorist service signs shall have White Legend and Border with Blue Background.

4. For mounting details see Index 700-020 for Type "A" breakaway or Index 700-010 for Type "C" Frangibility.

---

When approved for attachment to the advance guide signs, up to 3 services may be used for an exit. The symbol signs shall be suspended from the guide sign panel or existing wind beams. Symbol signs are not to be connected to existing sign posts.

The mounting height of the advance guide sign shall be increased, where necessary, to provide 8' between the level of the pavement edge and the bottom of the guide sign, prior to mounting the supplementary panel.
Tourist Information Center
NEXT RIGHT

Note: Sign FTP-14-06 shall be used as a supplemental guide sign at interchanges which have a Tourist Information Center approved for such signing (locate half-way between normal guide signs).

注释:
1. Sign FTP-14-06 应用于符合游客信息中心批准的互通口处（位于正常引导标志之间的一半处）。
2. Sign FTP-12-06 应位于游客信息中心附近的地面，尽可能远离建筑并尽可能远离主线道路（2个标志背靠背）。
3. Sign FTP-10-06, 11-06, 12-06 应作为有限访问高速路的补充引导标志。
4. 所有标志应为 Series E。
5. 请参见 Index 700-102 获取详情。
STATE OF FLORIDA
WELCOME CENTER
1 MILE

STATE OF FLORIDA
OFFICIAL
WELCOME CENTER

1/2 MILE

SIGN FTP-15B-06

SIGN FTP-15C-06

SIGN FTP-15A-06

SIGN FTP-12-06

FTP-15A-06

FTP-15B-06

FTP-15C-06

FTP-12-06

FTP-12-06

FTP-12-06

FTP-12-06

FTP-12-06

2,240'

2,240'

4. BOX

400' Minimum for Rural Conditions
50' Minimum for Rural Conditions

Notes:
1. Signs and sign structures shall be erected in accordance with the details shown on Index 700-020.
2. Sign FTP-12-06 shall be located on the Welcome Center grounds in proximity to the building and as far from the Main Line Roadway as possible (2 signs back to back).
3. All legend to be Series E.
4. One sign FTP-15A-06 or FTP-06 should be used depending on speed, roadside development & geometric conditions.

FOR PRIMARY HIGHWAYS
NOTES:

1. Roadways with Two-Way Traffic:
   No passing zone should be extended 1570' in advance of narrow bridge.

2. If the bridge or the approach is on a curve, delineators shall be installed for a distance of 1570' in advance of narrow bridge on the outside portion of the roadway. Spacing shall be 100' between delineators. Delineators are to be placed not less than 2' or not more than 8' outside the outer edge of pavement.

3. Object markers and delineators on both sides of roadway shall face traffic approaching bridge.

4. The OM-3R & OM-3L object markers shall be installed 4' off 18" Yellow Chevron for concrete roadways.

5. Shoulder Point.

6. Shoulder Width

<table>
<thead>
<tr>
<th>Shoulder Width</th>
<th>No. of RPM's</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
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<td>19&quot;</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>16.67&quot;</td>
</tr>
</tbody>
</table>

INSET B
MEDIAND SHOULDER

4 Yellow Reflective Markers Evenly Spaced 4' off 18" Yellow Chevron

Rumble Stripping For Asphalt Roadways Profiled Thermoplastic for Concrete Roadways

INSET A
OUTSIDE SHOULDER

4 White Reflective Markers Evenly Spaced 4' off 18" White Chevron

Rumble Stripping For Asphalt Roadways Profiled Thermoplastic for Concrete Roadways

Shoulder Point

Edge of Shoulder Paved

Edge of Travel Way

Shoulder Width

No. of RPM's

Spacing
SIGN LOCATIONS TYPICAL

2. Location of Sign 3 may require some field adjustment.
3. The Cross Road is the last detour to route around the restricted bridge.
4. Location of Sign 2 should be established from the Cross Road the following approximate distances: Interstate-1 Mile Non- Interstate-1/2 Mile.
5. See Index 700-102 for sign details.
4 - LANE DIVIDED INSTALLATION

WEIGH STATION AGRICULTURAL INSPECTION 1 MILE
FTP-5-06
ALL TRUCKS - TRAILERS PICKUPS - VANS NEXT: RIGHT
FTP-6A-06
WEIGH STATION AGRICULTURAL INSPECTION NEXT RIGHT
FTP-7A-06
TRUCKS - TRAILERS PICKUPS - VANS
FTP-9A-06
WEIGH STATION
DB-3
1500' Min.
1890'
1890'

MEDIAN INSTALLATION

WEIGH STATION AGRICULTURAL INSPECTION NEXT LEFT
FTP-1B-06
ALL TRUCKS - TRAILERS PICKUPS - VANS NEXT LEFT
FTP-8B-06
TRUCKS - TRAILERS PICKUPS - VANS
FTP-3B-06
WEIGH STATION
FTP-2B-06
1500' Min.
1890'

2 - LANE INSTALLATION

WEIGH STATION AGRICULTURAL INSPECTION 1 MILE
FTP-5-06
ALL TRUCKS - TRAILERS PICKUPS - VANS NEXT LEFT
FTP-6B-06
WEIGH STATION AGRICULTURAL INSPECTION NEXT LEFT
FTP-7B-06
TRUCKS - TRAILERS PICKUPS - VANS
FTP-9B-06
WEIGH STATION
FTP-3B-06
1500' Min.
1890'

MEDIAN INSTALLATION

WEIGH STATION AGRICULTURAL INSPECTION NEXT LEFT
FTP-1B-06
ALL TRUCKS - TRAILERS PICKUPS - VANS NEXT LEFT
FTP-8B-06
TRUCKS - TRAILERS PICKUPS - VANS
FTP-3B-06
WEIGH STATION
FTP-2B-06
1500' Min.
1890'

Note: Signs FTP-9A-06 to be placed at or near the theoretical gore.
NOTES:
1. Index applicable to residential and minor streets only. Major streets to be evaluated on a case-by-case basis.
2. Install Object Markers in accordance with Index 700-010
3. See Index 711-001 for pavement markings.
NOTES:
1. Work with Index 700-030.

2. Materials (Aluminum):
   A. Sheets and Plates: ASTM B209 Alloy 6061-T6
   B. Standard Structural Shapes: ASTM B308 Alloy 6061-T6
   C. Extruded Shapes: ASTM B221 Alloy 6061-T6
   D. Bolts, Nuts, and Washers:
      a. Bolts: ASTM F468 Alloy 2024-T4 with minimum 
         0.002-inch-thick anodic coating, chromate sealed
      b. Washers: ASTM B221 Alloy 2024-T4
      c. Nuts: ASTM F467 Alloy 6061-T6 or 6262-T9

3. Fabrication:
   A. See sign layout sheet for dimension "L" and sign face
      details in the Plans.
   B. Round all sign corners.

4. For right exits, install the Exit Numbering Panel to the
   top right side of the Highway Sign.

5. For left exits, install the Exit Numbering Panel to the
   top left side of the Highway Sign.

2'-0" Max
58% "L"
Exit Number Panel
(1/8" Thick Min.)

Bolt Exit Sign to Zee at 1'-0" Max. Spacing
Zee 1.75 x 1.75 x 1.08

Bolt Vertical Hanger to Horizontal Wind Beam

Back Elevation

MOUNTING EXIT NUMBER PANELS TO SIGNS
FY 2019-20
STANDARD PLANS
INDEX 700-110
1 of 1
**GENERAL NOTES:**

1. Install sign assemblies based on Alpha-Numeric Type designation shown in the Plans (e.g., Type A1).
2. Install sign and wind beam in accordance with Index 700-010 and Specification 700.
3. Engage all threads on the transformer base and post unless the aluminum post is fully seated into base.
4. Meet the requirements of Specification 646 for aluminum poles and transformer bases.
5. Install a concrete slab around all roadside assemblies on slopes 6:1 or greater. The minimum slab dimension is 4'-0" by 5'-0".
6. When wire entry holes are drilled in the sign column, use a bushing or rubber grommet to protect conductors.

**POWER CONFIGURATION 'B' NOTES:**

1. Install a separate pole for mounting the solar panel, controller and batteries for all roadside assemblies with solar panels, controllers and batteries weighing more than 170 lbs.
2. Install the auxiliary pole as close to the right of way boundary as possible.
3. Install the auxiliary pole so that the height is the same as the column for the roadside assembly.
4. Orient solar panel to face South for optimal exposure to sunlight.
5. The controller and the solar batteries may be located in the same compartment.

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<td>7</td>
<td>Roadside Sign Assembly-5</td>
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<td>Roadside Sign Assembly-6</td>
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<td>9</td>
<td>Overhead Sign Assembly</td>
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</table>
CONDUIT, WIRING, AND FOUNDATION DETAILS

**DETAIL "A"**
- Nominal 4" (Sch. 40) Aluminum Transformer Base
- #6 Ground Wire
- Concrete Apron (Typ.)
- 12" Bed of Pea Gravel or Crushed Stone For Drainage.
- 1/2 X 18" Anchor Bolts
- Connection (At all Pull Boxes)
- Copper Clad 1/2" Diameter 20' Long Copper Strain Relief Fitting
- #6 Ground Wire
- Nominal 4" (Sch. 40) Aluminum Cap Conduit
- Grounding Lug
- 2'-0" Dia.
- U.L. Approved Ground Rod
- For Power Service or Auxiliary Pole
- Strain Relief Fitting
- Circuit Conductors in Schedule 40 PVC Conductors and Conduit Spec as Shown in Plans (Typical)

**DETAIL "B"**
- Nominal 4" (Sch. 40) Aluminum Transformer Base
- #6 Ground Wire
- Conduit for Future Use
- Concrete Apron (Typ.)
- 12" Bed of Pea Gravel or Crushed Stone For Drainage.
- 1/2 X 18" Anchor Bolts
- Connection (At all Pull Boxes)
- Copper Clad 1/2" Diameter 20' Long Copper Strain Relief Fitting
- #6 Ground Wire
- Nominal 4" (Sch. 40) Aluminum Cap Conduit
- Grounding Lug
- 2'-0" Dia.
WARNING SIGN

12" Yellow Flashing Beacon

Sign Panel (48" x 48")

W-16-13P (24" x 18") Sign (When Shown in Plans)

Nominal 6" (Sch. 40) Aluminum

NOTE:
Type A1 Assembly (conventionally-powered) is shown. Type B1 Assemblies (solar-powered) similar.
Nominal 4" (Sch. 40) Aluminum

**NOTE:**

LIMIT
SCHOOL
FLASHING
WHEN

20

Beacon Controller

12" Yellow Flashing Beacon

55-1 (24" x 48") Sign

SPEED LIMIT
20
OR 15

WHEN FLASHERING

SPEEDING FINES DOUBLED

1'-0"

M in .

15

OR

See Index 700-1

Doubled Finishes

SPEEDING

TO PULL BOX

Nonmetal 4" (Sch. 40) Aluminum

Type A2 Assembly (conventionally-powered) is shown. Type B3 Assembly (solar-powered) similar.

NOTE:

FRONT VIEW

SIDE VIEW

ROADSIDE SIGN ASSEMBLY-2

ENHANCED HIGHWAY SIGNING ASSEMBLIES

FY 2019-20

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NOTES:
1. Type A3 Assembly (conventionally-powered) is shown. Type B3 assemblies (solar-powered) similar.
2. Use electronic speed feedback sign with 15" high numerals for posted speed of 45 mph or less, and
18" high numerals for posted speeds greater than 45 mph.
Nominal 4" (Sch. 40) Aluminum

NOTE:

20

OR

15

See Index 700-101

Doubled Speeding Fines

FTP-38-06 (24" X 30") Sign

55-1 (24" x 48") Highlighted Sign

Highlighted Sign Controller

Nominal 4" (Sch. 40) Aluminum

To Pull Box

FRONT VIEW

SIDE VIEW

NOTE:

Type A4 Assembly (conventionally-powered) is shown.
Type B4 Assemblies (solar-powered) similar.
NOTES:
1. Type A5 Assembly (conventionally-powered) is shown.
   Type B5 Assemblies (solar-powered) similar.
2. Use electronic speed feedback sign with 15" high numerals for posted speed of 45 mph or less,
   and 18" high numerals for posted speeds greater than 45 mph.
1. Type A6 Assembly (conventionally-powered) is shown. Type B6 Assemblies (solar-powered) similar.

2. Use electronic speed feedback sign with 15" high numerals for posted speed of 45 mph or less, and 18" high numerals for posted speeds greater than 45 mph.
OVERHEAD SCHOOL SIGN ASSEMBLY

NOTES:
1. Flasher unit and cabinet to be placed on the strain pole supporting overhead sign assembly or on service pole. The flasher unit not to overhang private property or sidewalk.

2. Optional flashing beacon will be called for in the Plans. They may be placed within or below the panel, or face to the rear.
**LEGEND:**
- B/C = BACK OF CURB
- EOP = EDGE OF PAVEMENT
- RPM = RAISED PAVEMENT MARKER
- W/R = WHITE/RED RPM
- Y/Y = YELLOW/YELLOW RPM
- W/Y = WHITE/YELLOW RPM

**GENERAL NOTES:**
1. Offset all RPMs 1" from solid longitudinal lines unless otherwise noted or shown.
2. Spacing may be reduced for sharp curves if required.
3. For placement of RPMs on ramps, see Index 711-003.
4. Make the traffic face of the RPM the same color as the pavement marking that it is supplementing.

**Typical Placement of Raised Pavement Markers**

- **Yellow RPM**
  - Direction of Traffic
- **MD/Y = MONO-DIRECTIONAL**
- **Y/R = YELLOW/RED RPM**
- **Y/Y = YELLOW/YELLOW RPM**
- **W/R = WHITE/RED RPM**
- **RPM = RAISED PAVEMENT MARKER**
- **EOP = EDGE OF PAVEMENT**
- **B/C = BACK OF CURB**
- **SOLID LINE WITH SKIP**
- **SKIP LINE WITH TWO-WAY LEFT TURN LANE**
- **ALTERNATING SKIP LINE WITH TWO-WAY LEFT TURN LANE**
- **ALTERNATING SKIP LINE**
- **SKIP LINE**
- **DOUBLE SOLID LINE**
- **MULTILANE**

- **Direction of Traffic**
- **SOLID LINE WITH ALTERNATING SKIP**
- **6" Double Yellow**
- **6" Black Contrast**
- **6" Yellow (10'-30')**
- **Y/Y RPMs (Typ.)**
**RPM PLACEMENT AT INTERSECTIONS**

- **Y/Y RPMs (Typ.)**
- **W/R RPMs (Typ.)**

**NOTE:**
- Center the Raised Pavement Markers between chevrons and crosshatching.

**LEGEND:**
- B/C = BACK OF CURB
- EOP = EDGE OF PAVEMENT
- RPM = RAISED PAVEMENT MARKER
- W/R = WHITE/RED RPM
- Y/Y = YELLOW/YELLOW RPM
- Y/R = YELLOW/RED RPM
- MD/Y = MONO-DIRECTIONAL YELLOW RPM

**RPM PLACEMENT AT TRAFFIC CHANNELIZATION AT GORE**

(Traffic Flows In Same Direction)

- **18" Yellow**
- **6" Yellow**
- **6" White**

**NOTE:**
- Install RPMs At 20’ Center To Center

**RPM PLACEMENT AT TRAFFIC SEPARATION**

(Traffic Flows In Opposite Direction)

- **6" Double Yellow**
- **18" Yellow**
- **6" Double Yellow**
- **6" Yellow**

**NOTE:**
- Install RPMs At 20’ Center To Center

**RPM PLACEMENT AT ROADSIDE CROSSHATCHING**

- **6" White**
- **W/R RPMs (Typ.)**

**NOTE:**
- Right side of the roadway shown. For the left side of roadway, the pavement marking is yellow and oriented opposite hand.
NOTES:

1. For Type "E" Curb, install RPMs along the pavement edge marking using the same spacing shown.

2. Orient traffic faces of RPMs in curb median radii to be parallel to direction of travel lanes.

LEGEND:

B/C = BACK OF CURB
EOP = EDGE OF PAVEMENT
RPM = RAISED PAVEMENT MARKER
W/R = WHITE/RED RPM
Y/R = YELLOW/RED RPM
Y/Y = YELLOW/YELLOW RPM
W/Y = WHITE/YELLOW RPM
MD/Y = Mono-DIRECTIONAL YELLOW RPM

FLUSH MEDIAN OPENINGS

RPM PLACEMENT AT MEDIAN OPENINGS
(When called for in the Plans)

RPM PLACEMENT DETAIL

POSTED SPEED LIMIT
"F" FEET

<table>
<thead>
<tr>
<th>速度限制公里</th>
<th>&quot;F&quot; 英尺</th>
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<tbody>
<tr>
<td>30 OR LESS</td>
<td>10</td>
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<td>35</td>
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</table>

TYPICAL PLACEMENT OF RAISED PAVEMENT MARKERS

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STANDARD PLANS
**NOTES:**

1. For Type "E" Curb install RPMs along the pavement edge marking using the same spacing shown.

2. Orient traffic faces of RPMs in median radii to be parallel to direction of travel lanes.

**LEGEND:**

- **B/C** = Back of Curb
- **EOP** = Edge of Pavement
- **RPM** = Raised Pavement Marker
- **W/R** = White/Red RPM
- **Y/Y** = Yellow/Yellow RPM
- **Y/R** = Yellow/Red RPM
- **MD/W** = Mono-Directional White RPM
- **MD/Y** = Mono-Directional Yellow RPM

**RPM PLACEMENT AT ISLANDS**

*(When called for in the Plans)*

**RPM PLACEMENT AT TRAFFIC SEPARATORS**

*(When called for in the Plans)*

---

**DESCRIPTION:**

**REVISION 11/01/18**

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**FY 2019-20 STANDARD PLANS**

**706-001 4 of 6**
**RPM PLACEMENT FOR CROSSES ON LIMITED ACCESS ROADWAYS**

- **1 Yellow RPM**
- **1500'-0" Yellow RPMs Spaced at 500'-0" Intervals Approaching Crossover (Typ. Each Side)**

**DETAIL "L"**

- **6" Yellow Edge Line**
- **Edge of Travelled Way**

**DESCRIPTION:**

- LAST REVIEW: 11/01/18
- INDEX: 706-001
- SHEET: 5 of 6
- FY 2019-20
- STANDARD PLANS
- TYPICAL PLACEMENT OF RAISED PAVEMENT MARKERS
BLUE RPM PLACEMENT

TWO-LANE ROADWAY

MULTILANE ROADWAY

MULTILANE ROADWAY WITH TURN LANE

LIMITED ACCESS ROADWAY

TWO-LANE ROADWAY AT INTERSECTION

MULTILANE ROADWAY AT INTERSECTION

BLUE RPM PLACEMENT
NOTES FOR PAVEMENT MESSAGES:

1. When an arrow and a pavement message are used together, locate the arrow a distance of "S" downstream from the pavement message. Measure the distance from the base of the arrow to the base of the pavement message. See the Pavement Message Spacing Table for "S" value.

2. Place all pavement messages 25' back from the stop line.

3. Dimensions are within 1" ±.

4. All grids are 4" x 4".

5. All pavement messages must be white except route shields.

6. Increase width of route shield for routes with three digits.

GENERAL NOTE:

1. See Index 509-070 for pavement markings at railroad crossings.

PAVEMENT MESSAGE SPACING TABLE

<table>
<thead>
<tr>
<th>Posted Speed (mph)</th>
<th>Distance &quot;S&quot; (feet)</th>
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<tbody>
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<td>25</td>
<td>30</td>
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<tr>
<td>30 - 35</td>
<td>36</td>
</tr>
<tr>
<td>40 - 45</td>
<td>40</td>
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<tr>
<td>45 - 50</td>
<td>58</td>
</tr>
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<td>50</td>
<td>88</td>
</tr>
</tbody>
</table>

PAVEMENT MARKINGS

11/01/18

MERGE ONLY LANE TURN LEFT RIGHT

25 MPH SUN PASS STOP BUS EXPRESS

Route Shield for Limited Access Roadways (Interstate Route Shield Shown; U.S. and State Route Shield Similar)

Route Shield for Arterials and Collectors (Interstate Route Shield Shown; U.S. and State Route Shield Similar)

State Route Shield Similar)

Route Shield Shown; U.S. and Access Roadways (Interstate Route Shield for Arterials

WHITE (Typ.)

RED

BLUE

PAVEMENT MESSAGE AND ARROW DETAILS

1. See Index 509-070 for pavement markings at railroad crossings.
**PAVEMENT MARKING LINES**

- **Solid Edge Line or Lane Line**
- **Solid Channelizing Line**
- **Two-Lane Passing Prohibited Lines**
- **Double Solid Lines**
- **12' Solid Pedestrian Crosswalk Line**
- **24' Solid Stop Line**
- **2'-4' Dotted Guide Line**
- **6'-10' Dotted Extension Line**
- **3'-9' Dotted Interchange Line**
- **3'-9' Dotted Lane Drop Line**
- **10'-30' Skip Line**
- **Double Solid Lines**
- **12" Solid Pedestrian Crosswalk Line**
- **24" Solid Stop Line**
- **2'-4' Dotted Guide Line**
- **6'-10' Dotted Extension Line**
- **3'-9' Dotted Interchange Line**
- **3'-9' Dotted Lane Drop Line**
- **10'-30' Skip Line**
- **10' White Skip With 10' Black Contrast and 20' Gaps**

**YIELD LINES**

- Yield lines consist of three 18" x 27" white triangles which face traffic. Equally space triangles within traffic lane when a bike lane is present, add one additional triangle in the center of the bike lane.

**CONTRAST MARKINGS WITH ALTERNATING SKIP PATTERN**

(10'-30' Skip Line Shown, Dotted Lines Similar)
**Curb and Gutter**

**Flush Shoulder**

\[ X = \text{LANE WIDTH (FT.)} \]
\[ Y = \text{BUFFERED BIKE LANE WIDTH (FT.)} \]

---

**Striping for Buffered Bike Lane**

**Striping with Shoulder or Non-Buffered Bike Lane**

**Striping with No Shoulder or Bike Lane**

**Notes:**
1. Lane widths (X) may not be same for each lane in the section.
2. For placement of RPMs, see Index 706-001.
INTERSECTION APPROACH STRIPING WITH TURN
LANES AND BUFFERED BIKE LANE KEY HOLE

NOTES:
1. Lane widths (X) may not be same for each lane in the section.
2. For placement of RPMs, see Index 706-001.
3. For placement of Express Lane markers and associated RPMs, see the Plans.

BUFFERED EXPRESS LANE STRIPING

PLACEMENT OF LONGITUDINAL PAVEMENT MARKINGS
CURB AND GUTTER SHOWN

PLACEMENT OF LONGITUDINAL PAVEMENT MARKINGS

DESCRIPTION:

REVISED 11/01/18

LAST REVISED 11/01/18

FY 2019-20

STANDARD PLANS

PAVEMENT MARKINGS

INDEX 711-001

SHEET 5 of 13
PLACEMENT OF LONGITUDINAL PAVEMENT MARKINGS

FLUSH SHOULDER SHOWN

DESCRIPTION:

10/30/2018

REVISED

FY 2019-20

STANDARD PLANS

PAVEMENT MARKINGS

INDEX

711-001

SHEET

6 of 13
PAVEMENT MARKINGS AND DELINEATORS FOR MEDIAN Crossover

PAVEMENT MARKINGS FOR INTERSECTIONS WITH MAJOR AND MINOR ROADS

NOTE:
1. Apply yellow reflective paint to the noses of curbed medians, traffic separators, and raised islands. When applying yellow reflective paint in conjunction with Raised Pavement Markers, see Index 706-001.

2. Use yellow retro-reflective sheeting on both sides of the delineator. Install the post so that the top is 4' above the grade at the edge of the pavement.

3. Extend double yellow centerlines 100' back from intersection on all approaches or 50' for unmarked cross roads.
Two Way Left Turn Lane
(With Single Lane Left Turn Channelization)

Right Turn Lane Drop and Island Details
Left Turn Lane Drop Is Mirror Image

Traffic Channelization at Gore

Right Turn Lane and Island Details

Revision
11/01/18

RoW
FY 2019-20

Pavement Markings

Index
711-001

Standard Plans

Page 8 of 13
LEFT ROADWAY CENTERED ON EXISTING ROADWAY

RIGHT ROADWAY CENTERED ON EXISTING ROADWAY

SCHEMES FOR TRANSITION - 2 LANE / 4 LANE ROADWAY

NOTE: Make pavement markings yellow for left roadway centered on existing roadway. Right roadway centered on existing roadway is similar with white pavement markings.

NOTE: See Sheet 1 for "S" value.

MARKINGS FOR TRAFFIC SEPARATION

DETAIL "D"

DETAIL "E"
STANDARD CROSSWALK DETAILS

NOTES:
1. For crosswalk width, exceed width of the adjacent sidewalk, but do not make width less than 6' for intersection crosswalks and 10' for midblock crosswalks. Measure width from the inside of the transverse crosswalk markings.

2. When the Special Emphasis Crosswalk is not perpendicular to the lane lines, make the longitudinal markings parallel to the lane lines.

3. Refer to Index 522-002 when Curb Ramps are present.

SPECIAL EMPHASIS CROSSWALK DETAILS
**Queue Length**

Stop Bar (If Required)

6" White

Begin Lane Line

6" White

Through Lane Becomes Exclusive Left Turn

12" White (3'-9')

(See Note 2)

Through Lane Becomes Optional Left Turn

6" Pavement Marking (See Note 2)

**SINGLE LEFT TURNS**

**Queue Length** is measured from the median nose radial point or, when a stop bar is required, from the stop bar.

**ARROW SPACING**

1. This Index also applies to right turn lanes.
2. Make pavement marking yellow for left-turn lanes and white for right-turn lanes.
3. See Sheet 1 for "S" value.

**NOTES:**

**URBAN CONDITIONS**

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>Clearance Distance</th>
<th>Brake To Stop Decel. Distance</th>
<th>Total Decel. Distance</th>
<th>Clearance Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>t_s</td>
<td>l_1</td>
<td>140</td>
<td>110</td>
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<td>70</td>
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<td>130</td>
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<td>160</td>
<td>140</td>
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<tr>
<td>55</td>
<td>120</td>
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<td>---</td>
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<tr>
<td>60</td>
<td>140</td>
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<tr>
<td>65</td>
<td>170</td>
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**RURAL CONDITIONS**

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<th>Clearance Distance</th>
<th>Brake To Stop Decel. Distance</th>
<th>Total Decel. Distance</th>
<th>Clearance Distance</th>
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<tr>
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<tr>
<td>65</td>
<td>170</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

**ARROW SPACING**

1. Three Arrow

2. Two Arrow

3. One Arrow

Arrow should be evenly spaced between first and last arrow. Turn lanes longer than 200' add one arrow for each 100' additional length.

**NOTES:**

1. This Index also applies to right turn lanes.
2. Make pavement marking yellow for left-turn lanes and white for right-turn lanes.
3. See Sheet 1 for "S" value.

**DOUBLE LEFT TURNS**

Through Lane Becomes Exclusive Left Turn

Through Lane Becomes Optional Left Turn

Turn Lane Markings
NOTES:
1. Dimensions are to the centerline of markings.
2. An Access Aisle is required for each accessible space when angle parking is used.
3. Criteria for pavement markings only, no public sidewalk curb ramp locations. For ramp locations refer to plans.
4. Tint blue pavement markings to match color 15180 of Federal Standards .09a.
5. Mount FTP-22-06 sign below the FTP-21-06 sign.

FOR ACCESSIBLE MARKINGS - SEE ABOVE

"DIMENSIONS"


 Use of pavement symbol in accessible parking spaces is optional, when used the symbol shall be 3' or 5' high and white in color.
NOTES:
1. All grids are 4" x 4".
2. Pavement Marking Should Not Extend Into Opposing Lane.
3. Center School Pavement Marking In Lane.

SCHOOL PAVEMENT MARKING

SCHOOL

MARKINGS FOR SCHOOL ZONES

SINGLE-LANE APPROACH

TWO-LANE APPROACH

MULTI-LANE APPROACH
(Three or More)
APPROACH TO INTERSECTIONS DETAILS

BUFFERED BIKE LANES

BICYCLE MARKINGS

FY 2019-20
STANDARD PLANS

INDEX
711-002

Sheet 2 of 2

DESCRIPTION:
REVISION
01/01/17

LAST
REVISION
01/01/17

FAR SIDE OF INTERSECTION DETAIL

Shared
Lane
150'

LANE
TRAVEL
LANE
BIKE
LANE
BIKE LANE STRIPING

Center of Solid Line
and Dotted Line
2'-4'
Radius Curb
Return or Stop Line
EOP

STOP
Return
Lane Width

6" White
Solid Line
6" White
Solid Line

6" White
Solid Line

6"

6"

6"

5' Min. From Curb Radius Return

5' Min. From Curb Radius Return
NOTES:
1. All bicycle markings and pavement messages shall be White.
2. All bicycle markings shall be preformed thermoplastic.
3. All grids are 4" x 4".

---

STANDARD PAVEMENT MARKING MESSAGE LAYOUTS

---

1. Shared Lane Marking (SLM)
2. Helmeted Bicyclist Symbol
3. Bike Lane Arrow
4. Railroad Crossing (For Shared Use Path Only)
1. Make the traffic face of the raised pavement marker (RPM) the same color as the pavement marking that it is supplementing.

2. See Index 706-001 for additional information on RPMs.
NOTES:

1. Place the Wrong Way Arrow at the physical gore or 100'-0" from the theoretical gore.

2. Post delineators spaced at 40' on curves of the entrance and exit of ramps. The spacing on the tangent portion of the ramp section is 300'-0". All delineators are to be setback 4' from shoulder break. Post delineators should not be discontinued in sections with guardrail.
NOTES:
1. Place the Wrong Way Arrow at the end of the physical gore or 100'-0" from the end of theoretical gore.
2. Post delineators spaced at 40' on curves of the entrance and exit of ramps. The spacing on the tangent portion of the ramp section is 300'-0". All delineators are to be setback 4' from shoulder break. Post delineators should not be discontinued in sections with guardrail.
Wrong Way Arrows

White/Red Raised Pavement Markers

6" White (10'-30')

6" Yellow

6" White (2'-4')

24" White

6" White (2'-4')

20'-0"

6" Yellow

6" White

White/Red Raised Pavement Markers

6" White

White/Red Raised Pavement Markers

6" Yellow (2'-4')

Special Emphasis Crosswalk
(See Index 711-001)

8" White

6" White (10'-30')

6" White

Special Emphasis Crosswalk
(See Index 711-001)

6" White (10'-30')

6" White

Wrong Way Arrows

NOTE:
Do not place wrong way arrows in between consecutive directional arrows.
EXIT RAMP WITHOUT AUXILIARY LANE

EXIT RAMP WITH AUXILIARY LANE

NOTES:

1. This Index shows layouts for 1, 2, and 3 lane ramps.
2. The message consist of white letters and numbers with black contrasting material.
3. The "EXIT NUMBER" position remains the same distance from the beginning of taper regardless of the number of lanes of information.
4. All grids are 4' x 4'.

MAT DIMENSIONS

MESSAGE SIZE AND SPACING
**CONVENTIONAL LIGHTING**

**WIRING DIAGRAM**

- Pole
- Luminaire
- Luminaire Cable
- Breakaway Fuseholders
- Strain Relief Fitting (See Note 2)
- PVC Conduit
- Pull Box
- Equipment Ground Conductor
- Pole Ground Conductor
- Ground Rod
- Equipment Ground Conductor

**WIRING DETAILS**

1. **Metal Pole Wiring Detail**
   - Luminaire Cable
   - Breakaway Fuseholders with solid copper slugs: Slugs to be same size as 10 Amp fuse.
   - Strain Relief Fitting (See Note 2)
   - #6 Solid Copper Ground Wire (Bare)
   - Grounding Lug
   - PVC conduit with Type TC Cable
   - 1" PVC conduit with #6 Solid Copper Ground Wire (Bare)
   - U.L. approved Ground Rod 8' diameter 20' long copper clad with approved ground connection (At all pull boxes)
   - Access Panel
   - Surge Protective Device (SPD)
   - #6 TW Green Bonding Ground
   - Strain Relief Fitting (See Note 2)

2. **Metal Pole Detail**
   - Pole setback 20'
   - unless otherwise noted on plans
   - Pull Box (See Metal Pole Wire Detail)
   - Edge of traveled pavement or face of curb.
   - 12" bed of Pearock or crushed stone for drainage.

**NOTES:**

1. Barrier wall or bridge mounted poles: The wiring shall be in accordance with Specification 962.

2. Provide cable length to remove fuseholders from transformer base, pole base or pullbox for maintenance. Remove slack from the luminaire cable to provide tension on the fuseholders if the pole breaks away. Pull excess cable into pull box tighten strain relief fittings or cable clamps at both ends of conduit to prevent cable from slipping.
NOTES:

1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class N5 with a minimum strength at 28 days of f_c=2.5 ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13" x 24"; others approved under Specifications 635 may be used.
5. Slabs to be placed around all Poles and Pull Boxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around pull boxes shall be included in the price of pull box.

Concrete for slabs around pull boxes shall be included in the price of pull box.
NOTES:
1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class NS with a minimum strength at 28 days of $f'c=2.5$ ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 1' x 24'; others approved under Specification 635 may be used.
5. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The expansion joint shall consist of $\frac{1}{2}$" of closed-cell polyethylene foam expansion material. The top $\frac{1}{2}$ of expansion material shall be removed after pouring the slab and sealed with an APL approved Type A sealant meeting the requirements of Specification 932.

Slab Details for Pole and Pull Box Locations
GENERAL NOTES:

1. Poles are designed to support the following:
   a. Luminaire Effective Projected Area (EPA): 1.55 SF
   b. Weight: 75 lb.

2. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not included in the Plans.

3. Materials:
   a. Pole, Pole Connection Extrusions and Arm Extrusions: ASTM B221, Alloy 6063-T6 or Alloy 6061-T6
   b. Bars, Plates, Stiffeners and Backer Ring: ASTM B221, Alloy 6063-T6
   c. Caps and Covers: ASTM D246, Alloy 319-H1
   d. Steel Bearing Plates: ASTM A709 or ASTM A36 Grade 36
   e. Aluminum Weld Material: ER 4043
   g. Bolts, Nuts, and Washers: ASTM F593, Alloy Group 2, Condition A, CW1 or SH1
   h. Shoe Base Bolts: ASTM F3125, Grade A35, Type 1
   i. Nuts: ASTM 1563 Grade DH Heavy-Hex
   j. Washer: ASTM A36
   k. Stainless Steel Fasteners: ASTM A276, Grade 316L, Type 316L
   l. Reinforcing Steel: Specification 415

4. Fabrication:
   a. Weld Arm and Pole (Alloy 6063) in the T4 temper using 4043 filler. Age the Arm and Pole artificially to the T6 temper after welding.
   b. Hot Dip Galvanize EJB and other steel items including poles and plate washers: ASTM A123
   c. Do not erect pole without Luminaire attached.

5. Coatings/Finish:
   a. Pole and Arm Finish: 50 grit satin rubbed.
   b. Galvanize Steel Bolts, Screws, Nuts and Washers: ASTM F2329
   c. Hot Dip Galvanize EJB and other steel items including poles and plate washers: ASTM A123

6. Construction:
   a. Foundation: Specification 655. Except payment for the foundation is included in the cost of the pole.
   b. Frangible Base, Base Shoe, and Clamp:
      i. Certify that the Clamp, Frangible Transformer Base, and Base Shoe Design are capable of providing the required load capacity.
      ii. Certify the Base conforms to the current FHWA required ASHTO Frangibility Requirements, tested under NCHRP Report 350 Guidelines (e.g. Akron Foundry TB1-17).
   c. Do not erect pole without Luminaire attached.

7. Embedded Junction Box (EJB): Install EJBs per Note 4 and in accordance with Specification 635, as shown on the following Sheets.

8. Wind Speed by County:
   - 120 MPH
   - 140 MPH
   - 160 MPH
     a. Braden, Broward, Charlotte, Collier, Escambia, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, Sarasota and St. Lucie Counties.

9. Specific Details:
   a. 2" x 4" (Max.) aluminum identification tag.
   b. Complete details and calculations for the reinforced 4"x 6" (Min.) handhole located 1'-6" above the base plate.
   c. Fabricator's Department-approved QC Plan must contain the following information prior to fabrication:
      i. Weld all seams continuously and grind smooth.
      ii. Perform all welding in accordance with AWS D1.2.
      iii. Test results showing the pole does not buckle at the shape transition area under the ultimate moment capacity loads.
      iv. Complete details and calculations for the reinforced 4"x 6" (Min.) handhole located 1'-6" above the base plate.
      v. Include the following information on the ID Tag:
         1. Project Name
         2. Pole Height
         3. Manufacturer's Name
STANDARD ROADWAY ALUMINUM LIGHT POLE W/ARM

STANDARD ROADWAY ALUMINUM LIGHT POLE W/TOP MOUNT

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON CYLINDRICAL FOUNDATION

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON SPREAD FOOTING FOUNDATION

SECTION A-A

Internal Vibration Damper

Transition zone from round shape to oblong shape

2'-6" Ø Concrete Foundation

(See Details on Sheet 4)

4'-6" (Min.) Handhole with reinforced frame and cover with Hex Head screws.

Begin Pole Taper

2'-6" Straight

1'-6"

3'-0" or 5'-6" See Sheet 3 (Typ.)

6" Ø Pole top with Cast Aluminum Cap attached to pole with 3 Stainless Steel Set Screws (Typ.)

Internal Vibration Damper

Transition zone from round shape to oblong shape

22-5'

2'-6"

3'-0" or 5'-6" See Sheet 3 (Typ.)

6" Ø Pole top with Cast Aluminum Cap attached to pole with 3 Stainless Steel Set Screws (Typ.)

Internal Vibration Damper

Transition zone from round shape to oblong shape

22-5'

2'-6"

3'-0" or 5'-6" See Sheet 3 (Typ.)

6" Ø Pole top with Cast Aluminum Cap attached to pole with 3 Stainless Steel Set Screws (Typ.)
At the pole connections, provide arm tube extrusions with dimensions as shown. Uniformly transition elliptical section to a cylindrical section at the arm connection.

The fabricator may substitute elliptical cross sections other than those tabulated, provided the section properties about the vertical axis and the area of the section equal or exceed that of the required section, and provide minimum wall thickness of 1/16" nominal and within the Aluminum Association Tolerances.

The outside diameter about the minor axis should be held at 2½" nominal and within the Aluminum Association Tolerances.
ARM-POLE TABLE

<table>
<thead>
<tr>
<th>Wind Speed and Arm Lengths (ft)</th>
<th>Height</th>
<th>Assembly</th>
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<td>120 mph</td>
<td>8, 10, 12, 15</td>
<td>A1-P1, A2-P1</td>
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<tr>
<td>140 mph</td>
<td>8, 10, 12, 15</td>
<td>A1-P1, A2-P1</td>
</tr>
<tr>
<td>160 mph</td>
<td>8, 10, 12, 15</td>
<td>A1-P1, A2-P1</td>
</tr>
</tbody>
</table>

POLE TABLE

<table>
<thead>
<tr>
<th>Pole</th>
<th>Pole Wall Thickness</th>
<th>Top of Base Shoe Weld</th>
<th>Inside of Base Shoe Weld</th>
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<tbody>
<tr>
<td>P1</td>
<td>0.156</td>
<td>3/8</td>
<td>3/4</td>
</tr>
<tr>
<td>P2</td>
<td>0.250</td>
<td>3/8</td>
<td>3/4</td>
</tr>
<tr>
<td>P3</td>
<td>0.313</td>
<td>3/8</td>
<td>3/4</td>
</tr>
</tbody>
</table>

ARM POLE NOTES:
1. See ARM SECTION detail on Sheet 3 for all A1 and A2 Values.
2. See Pole Table for all P1, P2, and P3 values.

POLE NOTES:
1. Pole wall thicknesses shown are nominal and must be within the Aluminum Association tolerances.
2. Thicker walls are permitted and tapered walls may be used in accordance with the minimum Aluminum Association thicknesses.

FOUNDATIONS:
1. Depths shown are for slopes equal to or flatter than 1:6. For slopes steeper than 1:4 and equal to or flatter than 1:2 add 2'-6" to foundation depths shown.
2. Foundation Tie Bars: #4 Tie Bars @ 12" centers (max.) or D10
class #6 MIU with 6" pitch, 3 flat turn top and 1 flat turn bottom. (See General Notes on Sheet 1)
**NOTE:**

1. For locations of Bearing Plates, Base Plates and Detail A' see Sheets 6 & 7.
2. Double Nuts: The bottom hex nut may be substituted by a half-height jaw nut.
3. Provide individual nut covers (not shown) for each bolt.
4. Pole wall thicknesses shown are nominal and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used in accordance with the minimum Aluminum Association thicknesses.

**BASE PLATE DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE**

**STIFFENER PLATE DETAIL**

**BASE PLATE PLAN**

**BEARING PLATE ELEVATION**

**BASE PLATE ELEVATION**
**Cylindrical Foundation Details for Median Barrier Mounted Aluminum Light Pole**

**Foundation Table**

<table>
<thead>
<tr>
<th>Design</th>
<th>Mounting Height (FT)</th>
<th>Foundation Depth (FT)</th>
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<tbody>
<tr>
<td>120</td>
<td>40</td>
<td>9</td>
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<td>9</td>
</tr>
<tr>
<td>160</td>
<td>40</td>
<td>9</td>
</tr>
</tbody>
</table>

**Plan**
- Reinforcing steel not shown.
- Provide dowel bars @ construction joint.

**Section C-C**
- Median Barrier (Index 521-001) 2'-0" 1'-0"
- Median Barrier (Index 521-001) 2'-0"
- Median Barrier (Index 521-001) 2'-0"
- Optional construction joint (See Note 2)
- Foundation depth (See Foundation Table)
- Foundation depth (See Foundation Table)
- Foundation depth (See Foundation Table)
- Optional construction joint (See Note 2)
- See detail 'A' on Sheet 5 for details.

**Notes:**
1. For Bearing Plate and Base Plate Details, see Sheet 5.
2. For connections to adjacent Median Barrier, use the dowelled joint detail per Index 521-001. Alternatively, a continuous concrete pour or a construction joint may be substituted; these alternatives require the Median Barrier's longitudinal steel to lap a minimum of 2'-0" with the longitudinal steel shown herein.

**Foundation Table**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Covers</th>
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<tbody>
<tr>
<td>2&quot; Ø Conduit</td>
<td>2'-6&quot; Ø</td>
</tr>
<tr>
<td>1&quot; Ø Conduit</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>1&quot; Conduit</td>
<td>1'-3&quot;</td>
</tr>
</tbody>
</table>

**Vane**
- #7 Bar (8 Rods)
- #7 Bars (equally spaced)
- 3" Exp. Jt. Material with Rigid Pavement only

**Foundation Design**
- Foundation Design
- Base Plate
- Bearing Plate
- Anchor Bolts
- Tie Bars
- #5 Bars, 6'-10" long (Typ.)

**Construction Joint**
- Construction Joint (Typ.)
- See Roadway Plans

**NOTES:**
- Provide dowel bars @ construction joint.
- For connections to adjacent Median Barrier, use the dowelled joint detail per Index 521-001. Alternatively, a continuous concrete pour or a construction joint may be substituted; these alternatives require the Median Barrier's longitudinal steel to lap a minimum of 2'-0" with the longitudinal steel shown herein.

**Details:**
- Embedded Junction Box (EJB)
- 1'-0" x 1'-3" x 6" (Typ.)
- Embedded Junction Box (EJB) See Sheet 6 for details.
- 1'-0" x 1'-3" x 6" (Typ.) Embedded Junction Box (EJB) See Sheet 6 for details.
- 1'-0" x 1'-3" x 6" (Typ.) Embedded Junction Box (EJB) See Sheet 6 for details.
- 1'-0" x 1'-3" x 6" (Typ.) Embedded Junction Box (EJB) See Sheet 6 for details.
- 1'-0" x 1'-3" x 6" (Typ.) Embedded Junction Box (EJB) See Sheet 6 for details.

**Grounding Rod**
- 2" Ø x 20'
- For grounding

**Line Gutter**
- Gutter Line
- EJB & Base Plate
- Barrier Longitudinal Steel

**Joint**
- Optional Joint (Typ.)
- Construction Joint (Typ.)
- Optional Joint (Typ.)

**Sheets:**
- Sheet 6
- Sheet 5
- Sheet 3
- Sheet 2
- Sheet 1

**Others:**
- Crash Barrier
- EJB & Base Plate
- Embedded Junction Box (EJB)
- Optional Construction Joint (Typ.)
- See Detail 'A' on Sheet 5 for details.
- Optional Construction Joint (Typ.)
- Foundation Design
- Base Plate
- Bearing Plate
- Anchor Bolts
- Tie Bars

**Revision History:**
- FY 2019-20 STANDARD PLANS
- INDEX 715-002
- SHEET 7 of 8
- LAST REVISION 01/01/17
- DESCRIPTION:
- STANDARD ALUMINUM LIGHTING
1. For Base Plate Details, Bearing Plate Details, and Detail 'A', see Sheet 5.
2. See Index 521-426 for details of adjacent Traffic Railing (Median 36" Single-Slope) and for angles 'A' and 'B'.
3. See Index 630-010 for Conduit, EJB and supplemental reinforcing details.

**At the Contractor's option, Bars SW may be fabricated as a two piece bar with a 1'-2" lap splice at the bottom legs.**
HIGHMAST LIGHTING NOTES:

1. Poles are designed to support the following:
   a. One (1) cylindrical head assembly with a maximum effective projected area of 6 sf and 340 lbs (Max.)
   b. Eight (8) cylindrical luminaires with a maximum effective projected area of 1.5 sf and 71 lbs each.

2. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.

3. High Mast Structure Materials:
   A. Poles and Backing Rings:
      a. Less than Fy, ASTM A1011 Grade 50, 55, 60 or 65
      b. Greater than or equal to Fy, ASTM A572 Grade 50, 55, 60 or 65
      c. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
   B. Steel Plates: ASTM A500 or ASTM A586
   C. Pole Caps: ASTM A1011 Grade 50, 55, 60, or 65 or ASTM B209
   D. Bolt Material: C1012
   E. Stainless Steel Screws: AISI 316
   F. Anchor Bolts, Nuts and Washers:
      a. Anchor Bolts: ASTM F1154 Grade 55
      b. Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
      c. Plate Washer: ASTM A13 (4 per anchor bolt)
   G. Nut Covers: ASTM B216 (319-F)
   H. Concrete: Class IV (Drilled Shaft)
   I. Reinforcing Steel: Specification 425

4. Fabrication:
   A. Welding:
      b. AASHTO LRFD Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Section 4.4.2
   B. Hot Dip Galvanize all other steel items including plate washers: ASTM A123
   C. Pole Caps: ASTM A1011 Grade 50, 55, 60, or 65
   D. Weld Metal: E70XX
   E. Stainless Steel Screws: AISI 316
   F. Anchor Bolts, Nuts and Washers:
      a. Anchor Bolts: ASTM F1554 Grade 55
      b. Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
      c. Plate Washer: ASTM A36 (2 per anchor bolt)

5. Coating:
   A. Galvanize Anchor Bolts, Nuts and Washers: ASTM F2229
   B. Hot Dip Galvanize all other steel items including plate washers: ASTM A123

6. Construction:
   A. Foundation: Specification 455 Drilled Shaft, except that payment is included in the cost of the Structure.
   B. After Installation: Place wire screen between top of foundation and bottom of baseplate in accordance with Specification 649.6

7. Wind Speed by County:
   130 MPH
   120 MPH
   110 MPH
   100 MPH
   - Brevard, Broward, Charlotte, Collier, Escambia, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, Sarasota and St. Lucie Counties.

STANDARD POLE DESIGN NOTES

High Mast Structure Materials:
- Poles and Backing Rings:
  - ASTM A1011 Grade 50, 55, 60 or 65
  - ASTM A572 Grade 50, 55, 60 or 65
  - ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
- Steel Plates: ASTM A500 or ASTM A586
- Pole Caps: ASTM A1011 Grade 50, 55, 60, or 65 or ASTM B209
- Bolt Material: C1012
- Stainless Steel Screws: AISI 316
- Anchor Bolts, Nuts and Washers:
  - Anchor Bolts: ASTM F1154 Grade 55
  - Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
  - Plate Washer: ASTM A13 (4 per anchor bolt)
- Nut Covers: ASTM B216 (319-F)
- Concrete: Class IV (Drilled Shaft)
- Reinforcing Steel: Specification 425

Fabrication:
- Welding:
  - AASHTO LRFD Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Section 4.4.2
- Hot Dip Galvanize all other steel items including plate washers: ASTM A123
- Pole Caps: ASTM A1011 Grade 50, 55, 60, or 65
- Weld Metal: E70XX
- Stainless Steel Screws: AISI 316
- Anchor Bolts, Nuts and Washers:
  - Anchor Bolts: ASTM F1554 Grade 55
  - Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
  - Plate Washer: ASTM A36 (2 per anchor bolt)

Coating:
- Galvanize Anchor Bolts, Nuts and Washers: ASTM F2229
- Hot Dip Galvanize all other steel items including plate washers: ASTM A123

Construction:
- Foundation: Specification 455 Drilled Shaft, except that payment is included in the cost of the Structure.
- After Installation: Place wire screen between top of foundation and bottom of baseplate in accordance with Specification 649.6

Wind Speed by County:
- 100 MPH: Brevard, Broward, Charlotte, Collier, Escambia, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, Sarasota and St. Lucie Counties.
### POLE DESIGN TABLE

<table>
<thead>
<tr>
<th>Design Wind Speed</th>
<th>Pole Overall Height (ft)</th>
<th>Base Dia (in.)</th>
<th>Minimum Splice Length (ft)</th>
<th>Wall Thickness (in.)</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 mph</td>
<td>80</td>
<td>0.250</td>
<td>2'-6&quot;</td>
<td>0.250</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>0.179</td>
<td>3'-0&quot;</td>
<td>0.250</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>0.179</td>
<td>3'-0&quot;</td>
<td>0.250</td>
<td>12</td>
</tr>
<tr>
<td>150 mph</td>
<td>80</td>
<td>0.250</td>
<td>2'-6&quot;</td>
<td>0.313</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>0.179</td>
<td>3'-0&quot;</td>
<td>0.313</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>0.179</td>
<td>3'-0&quot;</td>
<td>0.313</td>
<td>12</td>
</tr>
<tr>
<td>170 mph</td>
<td>80</td>
<td>0.250</td>
<td>3'-0&quot;</td>
<td>0.250</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>0.179</td>
<td>3'-0&quot;</td>
<td>0.313</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>0.179</td>
<td>3'-0&quot;</td>
<td>0.313</td>
<td>12</td>
</tr>
</tbody>
</table>

### BASE PLATE AND BOLTS DESIGN TABLE

<table>
<thead>
<tr>
<th>Design Wind Speed</th>
<th>Pole Overall Height (ft)</th>
<th>Base Place Diameter (in.)</th>
<th>Base Plate Thickness (in.)</th>
<th>Bolt Circle (in.)</th>
<th>No. Of Bolts</th>
<th>Bolt Diameter (in.)</th>
<th>Bolt Embedment (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 mph</td>
<td>80</td>
<td>30.0</td>
<td>3.000</td>
<td>3.000</td>
<td>8</td>
<td>1.75</td>
<td>23.0</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>34.0</td>
<td>3.000</td>
<td>3.000</td>
<td>8</td>
<td>1.75</td>
<td>27.0</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>38.0</td>
<td>3.000</td>
<td>3.000</td>
<td>8</td>
<td>2.00</td>
<td>30.0</td>
</tr>
<tr>
<td>150 mph</td>
<td>80</td>
<td>30.0</td>
<td>3.000</td>
<td>3.000</td>
<td>8</td>
<td>1.75</td>
<td>23.0</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>34.0</td>
<td>3.000</td>
<td>3.000</td>
<td>8</td>
<td>1.75</td>
<td>27.0</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>38.0</td>
<td>3.000</td>
<td>3.000</td>
<td>8</td>
<td>2.00</td>
<td>30.0</td>
</tr>
<tr>
<td>170 mph</td>
<td>80</td>
<td>32.0</td>
<td>3.000</td>
<td>3.000</td>
<td>8</td>
<td>1.75</td>
<td>23.0</td>
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<td></td>
<td>100</td>
<td>36.0</td>
<td>3.000</td>
<td>3.000</td>
<td>8</td>
<td>2.00</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>40.0</td>
<td>3.000</td>
<td>3.000</td>
<td>10</td>
<td>2.25</td>
<td>37.0</td>
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</table>

### SHAFT DESIGN TABLE

<table>
<thead>
<tr>
<th>Design Wind Speed</th>
<th>Pole Overall Height (ft)</th>
<th>Shaft Diameter</th>
<th>Shaft Length</th>
<th>Longitudinal Reinforcement</th>
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<tr>
<td>130 mph</td>
<td>80</td>
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<tr>
<td></td>
<td>100</td>
<td>4'-0&quot;</td>
<td>14'-0&quot;</td>
<td>16-#11</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>4'-0&quot;</td>
<td>16'-0&quot;</td>
<td>16-#11</td>
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<tr>
<td>150 mph</td>
<td>80</td>
<td>4'-0&quot;</td>
<td>14'-0&quot;</td>
<td>14-#11</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>4'-0&quot;</td>
<td>16'-0&quot;</td>
<td>16-#11</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>5'-0&quot;</td>
<td>18'-0&quot;</td>
<td>18-#11</td>
</tr>
<tr>
<td>170 mph</td>
<td>80</td>
<td>4'-0&quot;</td>
<td>15'-0&quot;</td>
<td>16-#11</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>4'-0&quot;</td>
<td>17'-0&quot;</td>
<td>16-#11</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>5'-0&quot;</td>
<td>20'-0&quot;</td>
<td>18-#11</td>
</tr>
</tbody>
</table>

**Note:**
- Shaft Design Table Shaft Length is based on level ground (flatter than 1:5).
- Increase the shaft depth in accordance with the Additional Shaft Depth Due to Ground Slope table for foundations with slopes 1:5 and steeper. Use the higher value for slope or diameter values that fall between those shown on the table.

### ADDITIONAL SHAFT DEPTH DUE TO GROUND SLOPE

<table>
<thead>
<tr>
<th>Ground Slope</th>
<th>4'-0&quot; Shaft Diameter</th>
<th>5'-0&quot; Shaft Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:3</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>1:2</td>
<td>4'-0&quot;</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>1:1</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>1:0</td>
<td>6'-0&quot;</td>
<td>7'-0&quot;</td>
</tr>
</tbody>
</table>

**Table continued...**
**SECTION A-A**

(T = Wall Thickness)

- **Center of Drilled Shaft**
- **Base Diameter**
- **Handhole Ring**
- **Base Plate Diameter**
- **Bolt Circle**
- **Anchor Bolts**
- **Tip Diameter**
1. At all pull boxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications for Road and Bridge Construction:
2. Slabs to be placed around all Poles and Pull Boxes.
3. For Pull Boxes between Poles refer to Index 715-001.
The contractor's attention is directed to those plan sheets detailing the mounting of luminaires at the pole top. Particular attention is directed to alignment of luminaire light distributions. Special attention must be exercised in the physical alignment of these luminaires to ensure that the approved photometric layout is physically produced at each lighting standard in the field. A marking shall be placed on the external face of the refractor to allow visual inspection of alignment. The marking shall correspond to the 0° axis of the refractor.

Luminaire support ring

Cover

Lift cable sheaves

Lift cables (2 minimum)

2" slip fitter

2" Slip/Fitter Assembly (equally spaced around ring)

Pole cable & sheaves

Power Cable Terminator

600 Volt rated Pole Cable. Size of conductors to be determined by luminaire load.

Luminaire support ring

Male Inlet

Pole Cable

Wrench

Covered receptacle to power luminaires when in the lowered position with Male Inlet.

Winch cable

Winch

Luminaire

Female Plug

Circuit Breaker Cable with Female Plug

Positive drive reversible winch

Pole cable

Ground Conductor

Equipment Support Plate

Circuit Panel Breaker

Grounding Array

#6 Bonding Ground

480V Phase toPhase

Ground to Winch

Power Cord With Male Inlet

Remote control switch

Supply cable receptacle

Remote control switch

120V. grounded receptacle for electric drill & receptacle for supply cable. (see schematic)

Step-down transformer provided with 320% grounded receptacle for electric drill & receptacle for supply cable. (see schematic)

25' minimum remote control cable same as Pole Cable.

All hardware for mounting heavy duty drill to pole shall be Stainless Steel.

3/8" heavy duty reversible or 1 HP Portable Motor(1) per project.

1/2 HP heavy duty reversible or 1 HP Portable Motor(1) per project.

Supply cable receptacle

Remote control switch

Step-down transformer provided with 320% grounded receptacle for electric drill & receptacle for supply cable. (see schematic)

25' minimum remote control cable same as Pole Cable.

All hardware for mounting heavy duty drill to pole shall be Stainless Steel.

3/8" heavy duty reversible or 1 HP Portable Motor(1) per project.

1/2 HP heavy duty reversible or 1 HP Portable Motor(1) per project.

Supply cable receptacle

Remote control switch

Step-down transformer provided with 320% grounded receptacle for electric drill & receptacle for supply cable. (see schematic)

25' minimum remote control cable same as Pole Cable.
NOTES:

1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class NS with a minimum strength at 28 days of f'c=2.5 ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13'' x 24''; others approved under Specification 633 may be used.
5. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The expansion joint shall consist of 1/2" of closed-cell polyethylene foam expansion material. The top 1/2" of expansion material shall be removed after pouring the slab and sealed with an APL approved Type A sealant meeting the requirements of Specification 932.
### GENERAL NOTES

1. The Railroad Company will furnish and install all track bed (ballast), crossties, rails, crossing surface panels and accessory components. All pavement material, including that through the crossing, will be furnished and installed by the Department or its Contractor, unless negotiated otherwise.

2. When a railroad grade crossing is located within the limits of a highway construction project, a transition pavement will be maintained at the approaches of the crossing to reduce vehicular impacts to the crossing. The transition pavement will be maintained as appropriate to protect the crossing from low clearance vehicles and vehicular impacts until the construction project is completed and the final highway surface is constructed.

3. The Central Rail Office will maintain a list of currently used Railroad Crossing Products and will periodically distribute the current list to the District Offices as the list is updated.

4. The Railroad Company shall submit engineering drawings for the proposed crossing surface type to the Construction Project Engineer and/or the District Rail Office for concurrence along with the List of Railroad Crossing Products. The approved engineering drawings of the crossing surface type shall be made a part of the installation agreement.

5. Sidewalks shall be constructed through the crossing between approach sidewalks of the crossing. Sidewalks shall be constructed with appropriate material to allow unobstructed travel through the crossing in accordance with ADA requirements.

6. Install pavement in accordance with the Specifications.

7. The Department will participate in crossing work, that requires adjustments to rail outside of the crossing, no more than 50 feet from the edge of the travel way.

### CROSSING SURFACES

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Concrete</td>
</tr>
<tr>
<td>R</td>
<td>Rubber</td>
</tr>
<tr>
<td>RA</td>
<td>Rubber/Asphalt</td>
</tr>
<tr>
<td>TA</td>
<td>Timber/Asphalt</td>
</tr>
</tbody>
</table>

### STOP ZONE FOR RUBBER CROSSING

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>Zone Length (Distance From Stop)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 or Less</td>
<td>250'</td>
</tr>
<tr>
<td>50 - 55</td>
<td>350'</td>
</tr>
<tr>
<td>60 - 65</td>
<td>500'</td>
</tr>
<tr>
<td>70</td>
<td>600'</td>
</tr>
</tbody>
</table>

Notes:

1. Type R Crossings are NOT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.

2. Single track Type R Crossings within the zones on the chart may be used unless engineering or safety considerations dictate otherwise.
CROSSING SHOULDER PAVEMENT
(Except Area Occupied By Crossing Surfacing Material):

a. To Shoulder Line For Outside Shoulders Less Than 6 Wide.
b. To 6 Maximum Width For Outside Shoulders 6 Or Wider (Regardless Of Approach Shoulder Pavement Width).
c. 6 For Median Shoulders

* Where the existing shoulder is substandard for the facility type, the shoulder width is to be widened to accommodate crossing shoulder pavement.

HALF PLAN ROADWAYS WITH FLUSH SHOULDERS

SECTION VIEW

TYPICAL CROSSING MATERIAL REPLACEMENT AT RR CROSSINGS

VERTICAL ROADWAY ALIGNMENT THROUGH A RAILROAD CROSSING

To prevent low-clearance vehicles from becoming caught on the tracks, the crossing surface should be at the same plane as the top of the rails for a distance of 2 feet outside the rails. The surface of the highway should also not be more than 3 inches higher or lower than the top of the nearest rail at a point 30 feet from the rail unless track superelavation makes a different level appropriate. Vertical curves should be used to traverse from the highway grade to a level plane at the elevation of the rails. Rails that are superelavated, or a roadway approach section that is not level, will necessitate a site specific analysis for rail clearances.